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ABSTRACT

The Mentor Teacher Project, initiated in 1985, involved the development and implementation of a new field component into the Academic Learning Teacher Education Program at Michigan State University. The field component, piloted with the Academic Learning students in the class of 1987, was subsequently revised and its impact on the class of 1988 students was studied. This final report of the project describes findings from the study. The first sections of the report describe the study as a whole, including the major questions addressed, the Academic Learning Program and its mentor teacher field component, the sample population, and the research methodology. The longest section of the report presents key findings about the ways in which prospective teachers' understandings in the four areas identified in the major research questions changed over time; these areas concern: (1) learning; (2) planning and teaching; (3) the subject matter knowledge needed to teach; and (4) the process of learning to teach and the importance of reflection. Two final sections discuss, respectively, the mentor teacher/faculty collaborative process and major issues that the program is continuing to explore as an outgrowth of the Mentor Teacher Program. Seven separately bound appendices contain: interview protocols for case study students, mentor teachers, and student teaching observers; student teacher and mentor questionnaires; guidelines for observing case study students; and student assignment sheets describing the 1986-1988 set of field tasks. (JD)

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MENTOR TEACHER PROJECT

PROGRAM ASSESSMENT REPORT

A Final Report

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Michigan State University

August, 1988

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MENTOR TEACHER PROJECT

PROGRAM ASSESSMENT REPORT

A Final Report

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MENTOR TEACHER PROJECT

PROGRAM ASSESSMENT REPORT

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ABSTRACT

The Mentor Teacher Project

Michigan State University

The goal of this project was to modify the Academic Learning Teacher Education program so that two important bodies of research were fully integrated into the program: a) research on conceptual change in the teaching and learning of subject matter, and b) research on preservice teacher education and its relation to classroom practice. The modifications of the program were designed to help prospective teachers come to understand this body of research in ways that would enable them to act on that knowledge. A needs assessment of the program and a review of the second body of research suggested that a new field component needed to be carefully integrated into the program in order to help prospective teachers meet that goal. The purpose of the field component was to deepen students' understanding of both research knowledge and knowledge gained from practice and to help them integrate both sources of knowledge. The field component that was developed is structured in unique ways, including the use of collaborating mentor teachers each of whom oversees an individual preservice teacher's field experiences for a two-year period. Students undertake field assignments each term under the joint supervision of the mentor teacher and university instructors. Mentor teachers and university faculty meet to study the research base and program goals, identify needs, and plan and revise field tasks appropriate for each course in the Academic Learning sequence. Work during years one and two focused on creation of field tasks and field support arrangements with the Class of '87 cohort of Academic Learning students. Beginning in Fall, 1986, a revised set of field tasks was implemented for the Class of '88 students. These students' experiences in the program were studied in the demonstration phase of the project (Fall, 1986 - June, 1988). Project activities were assessed in terms of their impact on preservice teachers' dispositions and abilities to draw from the conceptual change research base and from practice during student teaching to teach in a manner that facilitates conceptual understanding of worthwhile subject matter content in K-12 pupils. A second focus of the program assessment was on the mentor teacher/faculty collaborative process.

OVERVIEW OF
THE
PROGRAM ASSESSMENT REPORT

The Mentor Teacher Project, initiated in 1985, involved the development and implementation of a new field component into the Academic Learning Teacher Education Program at Michigan State University. The field component was piloted with the Academic Learning students in the Class of 87. The piloted component was then revised, and its impact on the Class of 88 Academic Learning students was carefully studied. This final report of the Mentor Teacher Project describes our findings from the study.

The report begins with sections describing the study as a whole: major questions addressed, a description of the Academic Learning Program and the mentor teacher field component, sample, and research methodology. The body of the report, in which findings are presented and discussed, is organized in five major sections. Thus, each of the five research questions (4 about impact on students and one about the mentor/faculty collaborative process) is reported and discussed in a separate section.

The five sections of findings are written in this document as drafts of individual papers that will be revised for presentation at professional meetings (AERA in March, 1989) and for publication. Thus, each of these sections can be read independently of the others. The reader can therefore read sections I-IV for the context of the study and then select one or more sections from Part V (4 papers about student outcomes) or Part VI (1 paper about the mentor/faculty collaborative process).

A final section describes major issues that the program is continuing to explore as an outgrowth of the Mentor Teacher Program. Implications for teacher education are also explored.

I. MAJOR QUESTIONS

A major goal of the Academic Learning Teacher Education Program is to help prospective teachers develop the knowledge, skill, and disposition to teach in a manner that promotes conceptual understanding of subject matter. Such a conceptual change orientation to teaching contrasts with the kinds of teaching that most Academic Learning students have experienced as students. Therefore, helping these prospective teachers value and implement such a view of learning and teaching is not easy. In the past, the sequence of Academic Learning courses succeeded in helping prospective teachers question traditional views of good teaching, but the student teaching experience later washed out the effects of these courses. Students came to value the practical lessons learned from their cooperating teachers and to reject conceptual change notions as too idealistic for use in "real" classrooms. The Mentor Teacher field component, an integrated set of field experiences woven into the two-year Academic Learning course sequence, was designed to help each Academic Learning student explore the meaning of conceptual change ideas in actual classroom contexts from the beginning of the teacher education program and under the guidance of a mentor teacher who could help the student link formal learnings about conceptual change teaching and learning of subject matter with more practical kinds of learning in the field.

Major questions about this innovative teacher education effort focused on two major issues:

1) Prospective teachers' abilities to link their understandings of conceptual change research/theory with the practical knowledge gained in the classroom. To understand the successes and failures of the new field component

in deepening students' understanding of conceptual change ideas and in linking those ideas with real classroom experiences, analysis focused on tracing over time students' developing understandings of four program themes:

a) Learning: How did the scaffolding of experiences (by course instructors and mentor teachers) in Academic Learning courses and field assignments help prospective teachers understand learning from a conceptual change, constructivist perspective? In what ways were Academic Learning students able/unable to act on this knowledge during student teaching?

b) Planning and Teaching: How did the scaffolding of experiences (by course instructors and mentor teachers) in Academic Learning courses and field assignments help prospective teachers understand conceptual change teaching goals and strategies? In what ways were Academic Learning students able/unable to act on this knowledge during student teaching?

c) Subject Matter Knowledge Needed to Teach. How did the scaffolding of experiences (by course instructors and mentor teachers) in Academic Learning courses and field assignments help prospective teachers understand the need for selecting and representing well-structured subject matter knowledge that is appropriate to pupils' developmental needs and that can be used flexibly for a variety of functions: to explain natural phenomena and historical events, to solve problems, to think critically about societal issues, to appreciate literature, etc. In what ways were Academic Learning students able/unable to act on this knowledge during student teaching?

d) Process of Learning to Teach: How did the scaffolding of experiences (by course instructors and mentor teachers) in Academic Learning courses and field assignments help prospective teachers become reflective practitioners who can integrate learnings from both formal study and classroom experience? In what ways were Academic Learning students able/unable or prone to reflect on their study of conceptual change planning and teaching and of constructivist views of the learner and to use those reflections in their own planning and teaching during student teaching?

2) Faculty/mentor teacher collaboration in the teacher education process. An important piece of the new field component was a new role for classroom teachers. Instead of simply providing a classroom context for our students' field visits, mentor teachers studied the Academic Learning Program goals and research base; collaborated with Academic Learning faculty in the design, evaluation, and revision of field assignments; and guided prospective teachers' work in the field. Thus, mentors played active roles in the teacher education process. The following questions about the mentor teacher role and collaborative process were studied: In what ways can classroom teachers actively support prospective teachers in making links between their formal study of conceptual change views of teaching and learning and their practical experience in the classroom? How can faculty/mentor interactions be structured so that they facilitate mentor input to the teacher education program yet also educate mentors about program goals and effective ways of mentoring? What roles can mentor teachers play in the teacher education process beyond simply providing a field setting for prospective teachers?

II. PROGRAM DESCRIPTION

Context and Rationale

The Academic Learning Program is a 2-year, primarily undergraduate, teacher education program for prospective elementary and secondary teachers. It is one of four alternative teacher education programs at Michigan State University, each of which focuses on developing prospective teachers' understandings of a particular aspect of teaching - either subject matter teaching, teaching of diverse learners, the social context of teaching and learning, or decision-making in teaching. These programmatic themes are used to help prospective teachers develop deep and useful knowledge of certain aspects of teaching and learning rather than to acquire bits and pieces of knowledge that are not meaningfully organized. Because this thematic emphasis means that some important issues in teaching and learning will not receive thorough attention in the preservice preparation, each program also emphasizes the importance of lifelong learning in teaching and teaches students to be reflective, inquiring practitioners.

Curriculum Themes in the Academic Learning Program

The primary goal of the Academic Learning Teacher Education Program is to help prospective elementary and secondary teachers learn to teach school subjects in a manner that promotes pupils' conceptual understanding of worthwhile subject matter content, and to take that goal on as a central purpose of their teaching. Four curricular themes are central to the program: (a) helping students adopt a constructivist view of learners who construct their own understanding of subject matter knowledge, and whose prior knowledge and experience influence their interpretations of instruction (Magoon, 1977; Davis, 1981; Posner et al., 1982); (b) helping students develop knowledge of effective strategies and appropriate learning environments for conceptual change teaching that will promote conceptual understanding; (c) helping students develop an understanding of the need for rich subject matter knowledge (Bruner, 1960/1982; Schwab, 1978) that includes knowledge of the structures of the disciplines, the functions of knowledge in subject areas, and the nature of inquiry and knowledge growth in the disciplines; and (d) helping these prospective teachers adopt a view of learning to teach as an ongoing process that requires continued study and reflections on teaching experience (Feiman-Nemser, 1983, Schon, 1983).

Research Base

Research knowledge about these curricular themes forms the theoretical base of the two-year program. In particular, the program has focused on cognitive psychological research on learning and its application to the problem of teaching subject matter for conceptual understanding.

Drawing from research in cognitive psychology, the program emphasizes the importance of viewing learners as drawing from both their experiences (instruction in school, for example) and their prior knowledge (including accurate or inaccurate conceptions developed over a lifetime of experience) to actively construct their own knowledge (Magoon, 1977; Davis, 1981; Bransford and Franks, 1976). Thus, learners are not seen as empty boxes waiting to be filled with knowledge. Neither are they partially filled boxes that just need more information added in to develop complete understandings. Rather, they are organizers and users of knowledge who must restructure their existing knowledge to accommodate new ideas, and who fully understand new knowledge only if they can use it to solve problems of importance to them. Because their own arrangement of ideas took a long time to build and because it makes sense to them, students have a difficult time making major changes in their ways of understanding. However, the development of conceptual understandings consistent with those held by experts in the disciplines requires such conceptual change. Thus, learning is a process of conceptual change and is often a complex and difficult task.

This research on the learning of specific subject matter concepts in schools has led to new understandings of why students fail to understand concepts that their teachers have taught them. For example, studies show that students often misinterpret information their teachers have presented in ways that their teachers never suspect. Students cling to their comfortable misconceptions in spite of teaching that presents contradictory information (Roth, 1984; Champagne, Klopfer, and Gunstone, 1982; Nussbaum and Novick, 1982). Thus, students fail to undergo appropriate conceptual change as a result of instruction, and teachers are largely unaware of the problem. Rather than teaching in ways that will foster conceptual change learning, teachers rely on ineffective methods such as the didactic approach of giving students facts and testing only for factual recall (Smith and Anderson, 1984).

In addition to identifying and describing this major problem of practice in teaching as it exists today, research on conceptual change can contribute to its solution in two ways. First, the research suggests specific improvements in teaching practices which can substantially improve student learning (Palincsar and Brown, 1984; Minstrell, 1984; Roth, 1984; Madsen-Nason and

Lanier, 1986). For example, by developing their own understanding of the structure and functions of the disciplines they teach, prospective teachers can organize their curriculum in ways that help students see and make connections between and among concepts. Moreover, they can explore multiple ways to represent content that will foster understanding (Wilson & Shulman, 1987). Second, the insights into student thinking and learning that come from this research can provide teachers with a framework for reflection of and improvement of their own practice (Lanier, 1983).

Academic Learning Students

The Academic Learning students typically enter the program as undergraduates in their junior year. Post-baccalaureate students are also accepted into the program. Each entering class of students consists of approximately 40 secondary education majors (10 each majoring in English, mathematics, the sciences, and the social sciences) and 25 elementary education majors. The students progress through the program as a cohort, with separate strands of coursework for elementary and secondary majors after the first two foundational courses.

Program faculty recognize that these learners, like K-12 students learning subject matter in schools, must change their conceptions of teaching and learning if they are to understand and use the curriculum themes emphasized in the program. Developing such understandings in a classroom setting is a protracted and difficult process. That is, prospective teachers need to identify ways in which their current ideas and beliefs (developed from their perspectives as elementary and secondary students [Lortie, 1975] and from their own belief systems [Nespor, 1987]) need to shift to a teacher's perspective that draws on the research base about the teaching and learning process as well as on practical experience. In addition to helping students make this transition to pedagogical thinking (Feiman-Nemser and Buchmann, 1985), the program must help them gain the knowledge and skills necessary to plan and teach in a manner that is consistent with conceptual change teaching. Thus, learning experiences are designed to be "transformative", where prospective teachers' learnings are more deeply integrated and ingrained within their thinking, and therefore more enduring than learning experiences where students simply imitate or add on to what they already know (Jackson, 1986; Sosniak, 1987). The faculty hopes to see a qualitative change (Johanson, Marton, & Svensson, 1985) in prospective teachers, so that they are not only more knowledgeable, but they also have the disposition to reflect on their actions and the "know how" to act on their knowledge when they teach.

Program Structure

Promoting such complex and difficult learning requires a coordinated and integrated set of educational experiences. Program themes are interwoven throughout the professional studies, giving students the opportunity to revisit issues and struggle with them over time in two settings: Academic Learning courses and classroom field settings.

Course sequence. Since the first cohort of students began the Academic Learning program in 1981, the program has used a series of courses that build on one another to help students develop a research-based conception of teaching and learning. This course sequence is a critical feature of the program, because it allows students to gradually deepen their understandings of the research and its implications for teaching as they move from one course to the next. In traditional programs, students select their courses from a list of required and elective courses and construct individualized course sequences. The professors of each course do not know what students have studied in previous courses. As a result, the student's "program" is a series of isolated courses, and the burden is placed on the student to construct any coherence among the courses. In contrast, the integrated course sequence in the Academic Learning program supports students in developing a coherent set of ideas about teaching as they move through the course sequence.

In this sequence (see Table 1 for course titles and timeline), courses with traditional titles (learning, curriculum, methods, etc.) are structured to highlight each of the four curricular themes of the program and to help prospective teachers consider the relationships among three participants in schools: the teacher, the learner, and the subject matter to be learned (Sizer, 1984; Bernstein, 1975). In the first year of coursework in the Academic Learning Teacher Education Program, this pedagogical relationship is explored by highlighting the role of one aspect in light of implications for the other two. Thus, while Academic Learning students learn to use the interpretive lens of making sense of the learning process to understand how individuals construct understanding of subject matter (in their educational psychology course), they do so in light of how the teacher facilitates understanding of particular subject matter in a classroom. Likewise, while students learn to use the interpretive lens of analyzing subject matter (understanding their discipline and school curriculum) to examine what is taught in schools, they do so in light of how characteristics of the learner and teachers' representations of subject matter during instruction shape what gets taught and learned. Finally, as students think about ways to plan and teach, they must consider the nature of the subject matter to be taught and ways in which learners will interpret the subject matter as well. As shown in Figure 1 and Table 4, courses in the program single out particular areas to highlight, but help students understand each area as it relates to or interacts with the other two.

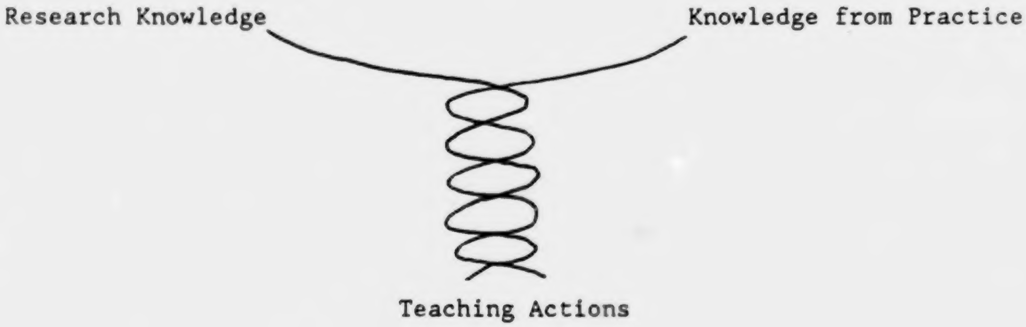
Thus, as they proceed through courses in the program, students gradually develop their understanding by considering the interconnections among various aspects of the pedagogical relationship. In this way, the content of the courses is closely coordinated.

Mentor teacher field experiences. In 1985-87 a new field component was integrated into the Academic Learning course sequence. This field component was designed to provide opportunities for students to integrate knowledge gained from research and theory studied in their Academic Learning courses with knowledge gained from classroom experience from the very beginning of their professional education preparation. The field assignments are closely linked to program themes studied in courses, and classroom teachers are involved in unique ways in the development of the field tasks and in support of students' work in making links between theory and practice.

This mentor teacher field component represented a change in the Academic Learning faculty's model of how educational research can be useful in the learning-to-teach process. In the past, Academic Learning faculty emphasized the development of a deep understanding of the research base prior to any experiences in the field. Students studied the theory and research deeply during the first year and were then expected to apply understandings of this research during their student teaching in the second year. Thus, research knowledge was assumed to be applied by students in a straightforward, unidirectional way:

Research Knowledge ------------------------> Teaching Action

Research in teacher education (Elbaz, 1981; Wilson, 1975; Ball and Feiman-Nemser, 1984; Schon, 1983; Feiman-Nemser and Buchmann, 1983; Phillips, 1980) and our own experiences in Academic Learning shed light on why this emphasis on understanding research knowledge alone does not impact on students' teaching performance. The implications for teaching from this research base have been assumed to be straightforward and obvious. How practical experience can provide students with new information that must be reconciled, integrated with, or added to research and theoretical knowledge has largely been ignored. Consistent with conceptual change learning theory, Academic Learning students need to change their understandings of the research findings in light of new knowledge derived from practice. Thus, a prospective teacher needs to understand both worlds of knowledge and learn to intertwine the two in order to decide on wise, defensible teaching actions:



This is clearly a difficult task! Simply being in school classrooms earlier and more extensively will not enable students to see theory in action or to deepen and change understandings of learning, teaching, curriculum, and subject matter. Although the new field plan features field experiences in conjunction with each of Academic Learning core courses from the very beginning of a student's program, this arrangement was not designed simply to increase the amount of time students spend in classrooms. Rather, the critical innovations are in the nature of the field tasks and their relationship to program themes and in the kind of support given to students during these experiences:

a) Nature of the field tasks. The field tasks are tightly coordinated with the four curricular themes developed in the Academic Learning course sequence and are structured to help students use various interpretive lenses (see Figure 1) in increasingly complex and integrated ways to make sense of and deepen their understandings of the teaching and learning of subject matter in classrooms. Students have repeated opportunities to analyze instances of difficult concepts in the field context.

In the first course (Learning of School Subjects), for example, students study learning theories and have the opportunity to visit their mentor's classroom, observe a lesson taught in their subject area, and interview a student about his or her understanding of the subject matter. Thus, they explore classroom teaching and subject matter primarily through the learning lens. They have the opportunity to construct personal sense of the learning theories studied in the course, to ask questions, and to raise issues concerning these theories and their usefulness in making sense of a particular instance of subject matter learning.

In the second core course (Curriculum for Academic Learning) students first use a subject matter lens to analyze an observed lesson; they map out the structure of the subject matter being taught and identify the various ways in which the teacher represented subject matter. Later, they analyze a section of a subject matter textbook using both subject matter and learning lenses: What are the structure and functions of the subject matter in this text chapter? How do those relate to ways students think about and learn in this subject matter? In a final set of assignments, students explore their mentor's intended curriculum (what was planned), enacted curriculum (what was taught) and actual curriculum (what was learned) using each interpretive lens (learning, subject matter, and teaching) separately to analyze the observed lessons and student interviews.

Later, in various methods courses, students shift from using the interpretive lenses for the purpose of analysis, to acting on the knowledge they have been developing. They plan and teach a unit in their mentor's classroom. The planning is structured in ways that engage students in using each interpretive lens in a stepwise planning process. In contrast, the actual teaching of the unit and the students' written reflections on the teaching require students to begin to integrate their use of the interpretive lenses and to consider additional interpretive lenses (such as the social organization of the classroom). Thus, over time, students have multiple opportunities to explore the curricular themes in classroom contexts. An overview of the key field assignments is presented in Table 2.

b) Support for learning from field tasks. A critical piece of the field component is the collaboration of Academic Learning faculty and classroom teachers (called mentor teachers) in supporting students' efforts to link understandings gained from research with those gained from classroom experience. Each student is matched with a classroom teacher (mentor) and works with that mentor and his/her students in completing all field assignments in the two-year program (including student teaching). The mentor teachers meet regularly (2-3 times each 10-week term) with program faculty to learn about the particular field assignments and how they relate to program goals/themes, to study the research base of the program, to discuss effective mentoring strategies, to discuss students' strengths and weaknesses, and to provide feedback about proposed or completed field assignments. Thus, mentors acquire the knowledge needed to support prospective teachers in completing field assignments and in understanding conceptual change ideas in classroom contexts. Mentors' work is not limited to the required field assignments, however. They also help their Academic Learning students come to understand the particulars of their classroom (students, curriculum, management strategies, school context, etc.) in less structured ways. Thus, they share their wisdom of practice with the prospective teachers.

Faculty members also provide important support to students in completing field assignments, beginning with careful planning of the field assignments and thorough preparation of the students before field assignments are begun. Detailed structuring and modeling of the assignments is provided with early assignments (e.g., as a class analyzing videotapes of a lesson prior to a field observation where students will do the same kind of analysis of a lesson in the mentors' classrooms). This support is gradually faded in later assignments. Faculty also provide opportunities in large and small group class discussion for students to talk about their experiences in the field and to consider alternative interpretations of classroom experiences. Finally, faculty respond to students' papers and journal entries, raising questions and offering alternative viewpoints to consider.

III. SAMPLE

Prospective Teachers. The study of the impact of the new field component focused on the students in the Class of 1988. This cohort of Academic Learning students consisted of 40 secondary education majors (in the areas of English, mathematics, science and the social sciences) and 25 elementary education majors. These students were the first cohort to go through the Academic Learning Program after the mentor teacher field component had been designed, piloted, and revised.

Twelve case study students were selected from this class for closer study. Students were selected to reflect the mix of students in the class. For example, 7 secondary majors and 5 elementary majors were included. Within the secondary group, each subject matter major of students in the program was represented: 2 English majors, 2 mathematics majors, 2 science majors, and 1 social science major. At the elementary level students with different subject matter strengths and interests were selected. The sample also represents the range of grade point averages in the total class, although all students entering the program had relatively high grade points (2.8 and above). Entry interview data were used to select students with varying backgrounds and entering conceptions about teaching and learning-to-teach. For example, the sample includes an older, transfer student as well as typical undergraduates. It includes students entering the program already holding some fairly sophisticated notions about teaching and learning as well as students who had rather naive ideas about teaching. Students also varied in their relative valuing of field experience in learning-to-teach. Some had entered the

Academic Learning Program because they had strong subject matter interests and wanted an intellectually challenging program. Others were attracted to the mentor teacher field arrangement and entered the program expecting to learn about teaching mostly from their mentor in the field.

Mentor Teachers. Because each mentor works with one student, there are 65 mentor teachers (40 secondary, 25 elementary) in the sample. These mentors began working with the Academic Learning Program in January, 1986, and were involved in the initial development, piloting, and revisions of the new field component. Thus, each mentor had had a year of experience with the program and with a Class of 87 student before beginning work with a Class of 88 student. Mentors were recruited from 6 local school districts, including urban, suburban, and semi-rural communities. Elementary mentors were located predominantly in K-5 elementary schools, while secondary mentors taught in both middle and high schools. In most K-5 and 6-8 buildings there were at least 2 mentors, and there were generally 2 mentors in a given department at the high schools. Mentors were recruited through recommendations of Academic Learning faculty, principals, and teachers, as well as by self-nomination. Teachers filled out an application, were interviewed, and were approved by their principal prior to being accepted as a mentor. Major criteria for selection included:

- the teacher's commitment to teacher education
- the teacher's openness to learning about educational research and Academic Learning Program goals and willingness to support Academic Learning students
- teachers with adequate time to devote to Academic Learning students.

We did not expect mentors to model a conceptual change orientation to teaching or to be knowledgeable about this research. However, a significant number of the teachers had participated in various research and professional development projects conducted by Academic Learning faculty in which they had learned about many of the Academic Learning Program goals. Others were known to program faculty through their work as cooperating teachers with earlier cohorts of student teachers. The mentors had between 2 and 29 years of teaching experience. Teachers were paid a stipend of $500 for working with one student over the two-year period. This amount did not begin to compensate teachers for the time required for meetings with faculty and students, and mentors reported that the stipend did not serve as a reason for participating. However, it did communicate to teachers that their expertise was valued, and it was one factor that helped to create a climate of collaboration rather than one in which teachers simply implemented faculty plans or merely provided a context for field assignments.

Academic Learning Faculty. The Academic Learning faculty included the various course instructors, student teaching supervisors, and program coordinators. There are two distinctive features of the faculty that are important to note. First, many of the faculty were involved with the students in more than one capacity. Most methods instructors, for example, also worked with 4-5 of the students during student teaching. Some faculty and teaching assistants played instructional roles in more than one course. The three program coordinators also taught courses and supervised student teachers. Finally, all Academic Learning faculty who worked with Class of 88 students also interacted with mentor teachers. The faculty members' willingness to play multiple roles reflects their commitment to the student teachers' development beyond a particular course. A second distinctive feature of the faculty is their active participation in classroom-focused research on teaching and/or research on teacher education. Many of the faculty conduct research that contributes to the literature on subject matter teaching that fosters conceptual understanding.

IV. METHODOLOGY

A variety of research strategies were used to provide multiple sources of information to address each of the research questions. In order to understand the complex interaction of factors that influenced both students' developing understandings and the evaluation of the mentor/faculty collaboration, 12 case study students and their respective mentor teachers were studied in depth over their two years in the program (1986-1988). Supplementary data from all Class of 88 students (n=65) and their mentors were collected at strategic points during the two-year period to provide a broader perspective on the program's impact and to allow us to assess the ways in which case study students' experiences were typical or atypical. An overview of the data sources in presented in Table 3.

Methods Used to Understand the Student Perspective. Case study students' developing understanding of four central program themes (constructivist views of learning, conceptual change planning and teaching, subject matter knowledge needed to teach, and the process of learning to teach) were probed in a series of in-depth interviews conducted during students' first month in the program and at the end of each term in the program. Each interview posed questions and tasks designed to elicit students' ways of thinking about each of the four targeted program themes and to provide insights about the sources of influence on students' thinking (course reading, assignments, field visits, mentor teacher, etc.). Some questions were asked in identical or nearly identical ways on several occasions to permit comparisons in students' answers at different points in time. For example, each term the students were asked to describe their image of the ideal teacher and any ways in which that image had changed since the last interview. This question was asked in nearly identical ways each term. In contrast, in trying to understand students' orientation to long-term planning we devised different tasks for use at different points in time. In early interviews students were simply asked to describe how they would go about planning a particular unit. At the end of student teaching we asked them to evaluate the usefulness of each piece of the unit planning format they had been required to use during student teaching. In the final interview we wanted to understand how they would now go about long-term planning, but we did not want students to simply list off their student teaching planning requirements. Therefore, the question was embedded in a text analysis task. Students were given a text chapter or segment and asked to describe what they would do with it if this were a text being used in their school. A complete set of student interview protocols is included in Appendix A.

To understand students' ability to act on their developing understandings during student teaching, each case study student was observed 8 times during student teaching, with the observer taking detailed field notes of instruction. The field observer also conducted informal interviews during these visits or in follow-up phone conversations. The documents in Appendix B describe the kinds of questions asked to guide these observations and the kinds of behavior that we considered as sources of evidence that the student teacher reflected program goals.

Interviews with the case study students' mentors, course instructors, and student teaching supervisors at the end of each term also provided insights into these students' developing understandings of program goals and their ability to act on those goals in their planning and teaching (interview protocols are in Appendicies A, B, and C). Samples of case study students' writing (journals, papers, field assignments, student teaching plans, and reflective essays) also supplemented the interview and observation data.

Data from the entire Class of 88 cohort was collected through questionnaires (entry, end of Year 1, end of student teaching questionnaires are located in Appendix D) and through samples of their unit planning and reflective essays during student teaching. Their mentors also completed questionnaires (see Appendix E) that evaluated the students' ability to teach for conceptual change at the end of Year 1 and at the end of student teaching. In addition, notes taken during classroom observations by student teaching supervisors were collected for all students.

Student interview transcripts were coded and analyzed, using the following broad categories: (a) overall goals and expectations for the program and for a teaching career; (b) developing a knowledge base for learning to teach; (c) image of the ideal teacher; (d) nature and quantity of interaction with mentor teachers; and (e) sources of influence on learning to teach. Students' overall development in each area was studied, in addition to noting particularly significant changes in their development over the course of the two years of interviews. Student writing was analyzed using the same categories. This provided a way to "triangulate" or cross-check (Gorden, 1986) inferences made from analysis of the interviews about students' development. Observation data and interviews with program faculty provided another source of information for cross-checking inferences made about student development and sources of influence on their development.

Taken as a set, these data sources provided multiple sources of information from which we reconstructed rich descriptions of students' experiences. These accounts of students' actions and understandings across time enabled us to track their changing conceptions of teaching and learning, to identify the sources of influence on those changing views, and to document ways in which prospective teachers did and did not link their understanding of program themes with their planning and teaching experience. Gathering information about each student from the mentor's perspective, from the faculty perspective, and from classroom observations was particularly helpful in confirming or raising questions about students' self-report of their understandings, orientations, and actions. The sample of case study students was large enough and the supplementary data from all students was extensive enough to pinpoint both key experiences that were meaningful across students and a variety of issues/experiences that were critical for particular students.

Methods used to understand the mentor teacher/faculty collaborative processes. In addition to probing mentors' insights about Academic Learning students' work in the classroom, the interviews conducted each term with the 12 case study mentors provided detailed information about the mentor teachers' interactions with students; the mentors' evolving understanding of program goals, research base, and field assignments; the mentors' conceptions of their roles and the faculty role(s); and mentors' reactions and support of the field assignments and program goals.

Analysis of the student interview transcripts focused on tracing students' developing understandings of program themes over time, and looking for sources of influence on students' development. In concert, mentor teacher interview transcripts were coded and analyzed using the following initial categories: (a) the mentor teacher role; (b) knowledge and understanding of program themes; (c) knowledge and understanding of students; (d) perceptions of mentor teacher workshops and meetings. Particular attention was paid to ways in which mentor teachers' knowledge, vision of the mentoring role, and understanding of the learning-to-teach process influenced the amount, nature, and substance of the interaction with their respective case study student. In addition, mentor teachers' developing knowledge and skills for taking on a teacher education role was analyzed. Finally, mentor teacher workshop notes were analyzed for ways in which the mentor-faculty collaborative process changed over time.

Faculty interviews provided similar insights as well as a picture of how the collaborative process influenced faculty planning and teaching. Notes taken during mentor-faculty meetings, tape recordings of selected mentor-faculty meetings, notes from faculty planning and debriefing meetings held before and after mentor meetings, and questionnaires administered to mentors at three points during the two-year period provided information on these issues from the total sample of mentors and teaching faculty. The case study student interviews, although primarily focused on assessing the impact of the program on student learning, also provided insights about mentor/faculty roles and the collaborative process.

V. RESULTS AND DISCUSSION: ASSERTIONS ABOUT PROSPECTIVE TEACHER'S ABILITIES TO LINK UNDERSTANDINGS OF CONCEPTUAL CHANGE RESEARCH WITH PRACTICAL KNOWLEDGE GAINED IN THE CLASSROOM

In this section key findings about the ways in which prospective teachers' understandings in four areas changed over time are described and discussed. The four areas of focus are those identified in the major research questions (see Part I): prospective teachers' developing understandings of (a) learning, (b) planning and teaching, (c) the subject matter knowledge needed to teach, and (d) the process of learning to teach and the importance of reflection in that process. Discussion of the findings related to each assertion will focus on ways in which faculty, mentors, and course and field assignments scaffolded students' developing understandings. Each section is written as a draft of a paper that will be developed into a full paper to be submitted for publication. Thus, each section can be read independently. Because each piece is meant to stand alone, there is some overlap of information about the program's structure and themes.

V.

A. THE ROLE OF EARLY FIELD EXPERIENCES IN PROSPECTIVE TEACHERS' DEVELOPING UNDERSTANDINGS OF CONSTRUCTIVIST, CONCEPTUAL CHANGE VIEWS OF LEARNING

Early Field Experiences: A Theoretical Perspective

There has been a long existing tension in teacher education between formal research-based knowledge and practical experiences as ways for people to learn to teach. Many findings have documented that the research-to-practice model embedded in most teacher education programs is not working. Students study research and theory in foundations courses (learning psychology, curriculum, etc.) and methods courses but then adopt utilitarian patterns of teaching during their student teaching. In response to these findings, some teacher educators have asserted that prospective teachers need more and earlier classroom field experiences. This is a view that is supported by most teachers; they place much higher value on the knowledge they have acquired from experience than the knowledge of research and theory gained from formal study of educational issues.

"Pitfalls of experience". But what does early field experience accomplish? If we want prospective teachers to develop meaningful, research-based conceptual frameworks to guide their planning and teaching, early field experience may not be the answer. Feiman and Buchmann (1983) argue that such a heavy emphasis on early and extensive field experience may only serve to make matters worse. Such field experience, if it is more of the same kinds of experiences that students traditionally have during student teaching

(tips, how-to's, steps in lesson planning, trial and error) may lead to even more strongly entrenched utilitarian, practical approaches to teaching. Prospective teachers may get better at copying their cooperating teachers, but they may not develop the knowledge, skills, and disposition to become thoughtful, reflective practitioners who can draw from research and theory as well as from practice to make teaching decisions. Student teachers may develop a false belief that they have mastered teaching because they can successfully copy their cooperating teacher. Wilson (1975) notes that "the possibility of increased confidence is offset by the equal possibility of smugness and reinforced misperception." Such thinking arrests thought and prevents future growth. Student teachers may graduate and enter the teaching profession holding the same limited conceptions of good teaching that they held when they entered their teacher education programs.

Catch-22? The body of research on learning to teach and our own experience with prospective teachers in the Academic Learning Program have shown that an early emphasis on research/theory prior to any field experience is not meaningful for most students. In order to integrate theory and research with practice in a way that will change their actions as teachers, prospective teachers seem to need classroom experience at the same time that they study research. However, early field experience is clearly fraught with dangers. Are we in an unresolvable, Catch 22, situation?

A new perspective for looking at early field experience. The conceptual change research base that Academic Learning faculty want prospective teachers to understand and use in their thinking about teaching K-12 students is also a useful conceptual tool in analyzing the learning-to-teach process. What does it take for prospective teachers to undergo their own conceptual change -- to relinquish or modify their entering, limited conceptions of good teaching and to construct meaningful understandings of alternative conceptions?

Like K-12 students learning about science or math or history, these prospective teachers bring their own conceptions and ideas about teaching and learning to their teacher education programs. If teacher candidates are going to make sense of the theory and research studied in their teacher education programs, these conceptions need to be challenged, reexamined, modified, and integrated with alternative conceptions. Are they the most powerful ways to think about teaching and learning, or are there alternative frameworks that will have more impact on student learning? Prospective teachers themselves must bring their own ideas out in the open for examination and reconcile their views with alternative conceptions. For this conceptual change process to occur in meaningful ways, prospective teachers (like K-12 students) need careful support and numerous opportunities to work with new conceptions in a variety of "real world" contexts. To illustrate, fifth grade students who believe that plants take in food from the soil or air need numerous opportunities to try to explain real-world phenomena using the scientific idea that plants make their own food. Simply telling them that "plants make their food and do not take it in from the soil" will not foster meaningful conceptual change. Similarly, prospective teachers who believe that good teaching consists of delivering clear, well-organized explanations and keeping students quiet so they can hear these explanations will not shift their thinking just because a professor espouses a different view. The prospective teachers need opportunities to work with an alternative view in a context that will be meaningful to them - the classroom. They need opportunities to look at classrooms through different lenses than they have used as students in classrooms.

This view of teacher learning suggests an alternative model of early field experiences, and this model was used in developing the mentor teacher field component of the Academic Learning Program. In this model, early field experiences are designed to engage prospective teachers in actively grappling with the conflicts between their entering conceptions of teaching and learning and those discussed in Academic Learning classes and to begin a long-term process of conceptual change. Thus, the purpose of early field experiences is to provide a context that will challenge students' assumptions about teaching and learning and that will start them on a long journey in which they can begin to resolve some of the dilemmas raised by research-based conceptions of good teaching and practical issues in the classroom. In addition to field tasks that focus students' attention on raising and resolving conflicts between research and practice, this model of early field experience includes complex scaffolding from both program faculty and classroom teachers. For this scaffolding to be effective, it has to be carefully structured to focus prospective teachers' attention on critical issues which they might otherwise miss or ignore. However, the structure of the scaffolding must be flexible and its use gradually diminished over time for students to genuinely construct their own understandings.

Purposes of this Study

This paper explores an alternative model of early field experience by describing the ways in which 12 focal students in the Academic Learning Program experienced and understood research-based curriculum themes as they were developed in field experiences integrated into the first two courses in a 2-year program sequence. The courses were foundations courses, the first of which focused on the learning of school subject matter and the second on school curriculum. How did students' understandings and use of concepts developed in these foundational courses change over time, and how did the early field experiences influence these understandings? In what ways did the early field experiences contribute (or fail to contribute) to Academic Learning students' conceptual change?

Curricular Themes Embedded in Foundations Courses

Although the two foundations courses differed in emphasis, with the first course centered on the learner and the second course focused on curriculum, both courses are intended to help students develop gradually deepening understandings of four curricular themes in the Academic Learning Program. Each of these themes contributes to an overall view of good teaching that Academic Learning faculty characterize as conceptual change teaching. A central goal of the program is for students to adopt such a conceptual change stance towards their teaching of subject matter. For students to develop such a framework for thinking about teaching, the program faculty believe that meaningful understandings of the four conceptual themes described below are critical.

A constructivist view of the learner. Drawing from research in cognitive psychology, the program emphasizes the importance of viewing learners as drawing from both their experiences (instruction in school, for example) and their prior knowledge (including accurate and inaccurate conceptions developed over a lifetime of experience) to actively construct their own knowledge. Thus, learners are not empty boxes waiting to be filled with knowledge. Neither are they partially filled boxes that just need more information added in to develop complete understandings. Rather, they are organizers and users of knowledge who must restructure their existing knowledge to accommodate new ideas, and who fully understand new knowledge only if they can use it to solve problems of importance to them. Because their own arrangement of ideas took a long time to build and because it makes sense to them, students face a very difficult task in understanding disciplinary concepts that are different from their own understandings. Thus, meaningful learning of subject matter concepts requires students to undergo a complex process of conceptual change. For such learning to occur, students must be involved in actively constructing meaning.

The need for rich subject matter understandings. Teaching for conceptual change requires rich, conceptually-focused understandings of the subject matter to be taught. Academic Learning students often do well in courses in their subject matter specialties without developing such understandings. Helping them become aware of the need for such understandings begins in the learning course with an emphasis on the nature of inquiry and knowledge growth in the respective disciplines and an analysis of the structure of the disciplines. This theme is further developed in the curriculum course, with faculty emphasizing the importance of understanding the structure of the subject matter to be taught (What are the main concepts and what are the various ways in which they are related to each other?), the functions of the subject matter (How is this knowledge useful and relevant? Why is it important for students to understand?), and the relationship of the subject matter to student development (How does the experts' way of understanding this subject matter compare with students' ways of thinking about it? What are the critical gaps, confusions, or misconceptions in students' ways of thinking? How can student's prior knowledge be used productively in helping them understand experts' ways of thinking?) (Anderson, 1987). In addition, students explore how subject matter can be transformed for teaching purposes (pedagogical content knowledge) and the importance of being able to represent subject matter in a variety of ways (Wilson & Shulman, 1987).

Knowledge of effective strategies and appropriate learning environments for conceptual change teaching. In a conceptual change view of teaching, the teacher's central purpose is to help K-12 students develop meaningful, conceptual understandings of worthwhile content. A conceptual change teacher selects instructional tasks, activities, and questions that will engage student thinking and promote student development of central ideas and concepts within and across the disciplines. While methods courses serve as a critical place to help students develop this knowledge base, in the Academic Learning Program the process begins in the foundations courses. In the learning course, students read about and critically evaluate different approaches to teaching in relationship to the theories of learning that they study (Fenstermacher and Soltis, 1986). Case studies of conceptual change teaching in the respective subject matter areas are used in the curriculum course to develop basic principles of instruction that would engage students in constructing conceptual understandings.

Learning-to-teach as an ongoing process that requires analytical reflection. Conceptual change teaching requires a questioning stance in curriculum decision-making and an analytical approach in the selection of classroom tasks. Thus, an important program goal is to help students become reflective, analytical teachers who evaluate their own teaching and new teaching strategies suggested to them in terms of careful assessments of student learning and of the subject matter. Both of the foundation courses are structured in ways that faculty hope will help students become more analytical about classroom teaching and learning. In particular, these two courses focus on helping students learn how to weave together their understandings derived from the study of theory and research and their understandings of classroom teaching practice. It is intended that such a weaving process will result in some important reshaping of students' entering notions about classrooms, about teaching, and about the learning process.

Relationship of Program Themes to Field Assignments in the Foundations Courses

The field assignments integrated into the foundations courses are designed to help Academic Learning students construct meaningful understandings of these curriculum themes. They are structured in ways that engage students in confronting right from the onset the tensions between theory, research, and classroom practice. The field provides the students with a specific context in which to think about course concepts and themes in less abstract, idealistic ways.

Table 2 provides an overview of the field assignments and the purposes of each. The table illustrates how the early field assignments relate to program themes. In the learning course, for example students spend two classroom visits observing and analyzing one student's learning of particular subject matter. Each prospective teacher analyzes one student's understanding in terms of learning theories discussed in class, especially constructivist views of the learner. In the curriculum course, the emphasis in the first field assignments is on analysis of the subject matter, (the intended curriculum) and ways in which subject matter is transformed for teaching (enacted curriculum). However, constructivist and conceptual change views of the learner are also revisited in the context of these assignments (the actual curriculum). Thus, program themes introduced in the learning course are revisited in the curriculum course. In both courses, field assignments are structured around these program curricular themes.

For each field assignment, students are given a written description of the purposes for the field visit and a set of questions to guide their thinking in the field. The assignment sheet also describes the framework for analysis and the requirements for write-up of the experience. Students are also prepared for the visit in their foundations courses. Frequently, there is extensive modeling and discussion of the strategies to be used in the field. For example, course instructors in the curriculum course showed videotapes of classroom instruction in the different subject areas and taught Academic Learning students how to take field notes while observing a lesson. They then led discussions with their respective subject matter discussion groups to give students practice in analyzing the structure of the subject matter and the representations of subject matter used by the teacher.

In these preparation activities, instructors model the kinds of analysis and reflection that they want students to do. There are also other ways in which assignments are structured to encourage reflection and analysis. For example, students have the opportunity to talk about their field visits in their subject-matter focused discussion groups in both the learning and curriculum courses. In addition, students are required to write a paper about each field assignment. The paper is shared with both course instructors and the mentor teacher, and this feedback contributes to the cycle of observation, reflection, and analysis.

The field assignments are not extensive in terms of actual time spent in classrooms. They are extended, however, through the ways in which they are introduced and followed up in the foundations courses. These field assignments are not supplements to course requirements; rather, the field assignments are the core assignments students complete in these courses.

Case Study of Dave's Conceptual Change

What sense did students make of these curriculum themes, and how did the field experiences, in particular, contribute to their developing understandings? In this section we present a description of one student's experiences with the field assignments in the two foundations courses and their impact on his thinking about teaching and learning. His case was selected for presentation because it is a positive exemplar (although not the strongest example) of the impact of the program experiences and because it illustrates several patterns of development that were seen in most of the 12 case study students. Dave's story will be used to define these patterns of development and the key features of the courses and field experiences that supported such development.

Entry Framework for Dave's Thinking About Teaching and Learning

Dave is a Biology major who entered the Academic Learning Program after deciding to switch from pre-med to a teaching major. The decision to change majors was precipitated by difficulties in Chemistry courses and a slipping grade point average. Worrying more and more about the grades in these courses seemed to make the problem worse. He found he was enjoying his science classes less and less, having to focus on pulling up grades rather than exploring the subject matter. All of this led to some soul searching. His girlfriend was planning to be an elementary teacher, and this led him to think about teaching as a possible career. The more he thought about teaching, the more he decided it was a perfect fit with his interests and personality. He has always loved Biology, largely because he is an outdoors person who loves to hunt, fish, and hike. He also enjoys sports and could see himself getting involved in coaching. He described himself as a very caring person, who has an ability to lead people without them knowing he is leading. The public speaking aspect of teaching was also appealing to him. And on top of all that, he really enjoyed working with kids. Shortly after an all-night session of wrestling with this decision to switch majors, Dave applied for the Academic Learning Program.

From Threads to Cloth: Dave's Developing Understandings of the Learning, Subject Matter and Teaching Curriculum Themes

Experiences in the learning course. Dave viewed the learning course as an important place for him to explore further his decision to become a teacher. He visited the field beyond what was required for the field assignments, and these visits and discussions with his mentor teacher, Bill, were very important in helping Dave solidify his choice of teaching as a career. Although the main focus of the course was on the development of constructivist, conceptual change views of the learner, Dave focused instead on the parts of the course that explored different approaches to teaching. He wrote extensively in a course journal about his reasons for wanting to teach, about his excitement in visiting his mentor's middle school classroom, about his mentor's approach to teaching, and about the personalities and behaviors of students in Bill's classes. He wrote very little, however, about constructivist or other theories of the learner. At the end of the term, Dave's final paper for the course reflected his emphasis on teaching approaches rather than learning theories in this foundations course:

> How can I summarize the ways in which my views on teaching have changed when my head seems to be whirling with questions that, as of yet, have been unanswered. Perhaps the most important function of my first teacher education course was not only to present me with several differing approaches to teaching, but to get me to raise questions, by seeing flaws in my beliefs, concerning all aspects of teaching and the learning environment, and on this point it has succeeded tremendously.

Thus, the learning course served two important functions for Dave. First, it gave him confidence in his career choice. He felt comfortable with the students in the classroom, he felt confident he could teach the subject matter in the seventh grade life science curriculum, and he respected and admired his mentor teacher, his course instructors, and other students in the Academic Learning Program. The discussions and readings in the course also contributed to his growing desire to be a teacher because they emphasized the complexities and challenges of good teaching. Thus, both his field visits and experiences in the course contributed to Dave's growing confidence in teaching as career choice.

The second important function of the course was that it raised questions in Dave's mind about his assumptions about what constitutes good teaching. Dave learned about different approaches to teaching and recognized at the end of the term that he had much more learning to do. In fact, he ended the term not only lacking a particular framework for thinking about teaching but seeing teaching as more idiosyncratic and subconscious than before:

> At present I have no faithfully entrusted methods which I could use under all circumstances with belief in their effectiveness. I see teaching as more a matter of instinct than ever before.

His description of the ideal teacher, for example, is not sharply defined and does not link closely to any of the program curricular themes: a teacher students would want to have, a teacher who has a good reputation in the school, a teacher who presents ideas clearly and in interesting ways, and a teacher from whom students would learn a lot. In constructing this description, Dave was not drawing from frameworks or approaches to teaching discussed in the learning course; rather, he was describing his perception of his mentor teacher. Thus, at the end of his first term, Dave considered his mentor teacher to be the ideal teacher. Although he talked in his interview about the approaches to teaching discussed in the course, he had not used any of these approaches to describe his ideal teacher or to provide a frame to describe his mentor's teaching. Links between theory and practice regarding the teaching theme were tenuous at best.

While the teaching issues addressed in the course clearly stimulated Dave's thinking and raised many questions in his mind, the learning "thread" in the course did not have a powerful impact on Dave's thinking. He ended the learning course quite unsure about the usefulness of learning theories. In his interview, he did not mention learning theories as being important ideas he had thought about during the course. When asked by the interviewer about learning theories and their usefulness to him, he admitted that he had been a little confused about this part of the course. He said he could see good ideas in each of the learning theories discussed in the course but was vague in trying to describe some of these good ideas. Responding to the interviewer's probes to clarify and elaborate his description, he replied that he clearly needed to do some journal writing about these ideas to push further his thinking about them. He reported that he did not think about learning theories when he was in his mentor's classroom, although he thought it would be useful to do that.

In a traditional model of teacher education, Dave would be viewed as having failed to apply his study of learning theory and teaching approaches to the classroom. His course instructors might be frustrated that all they had done was raise questions in his mind but that his understandings of course concepts were quite superficial. However, unlike traditional course-bound teacher education programs, this was not the end of Dave's exploration of approaches to teaching or of constructivist, conceptual change views of the learner. These ideas were revisited as integral themes of the curriculum course and its associated field assignments, and the questions raised in Dave's mind during the learning course played a critical role in his developing understanding of program themes.

Experiences in the curriculum course. During the curriculum course, Dave was often confused, frustrated, and lost. He had trouble with one of the early assignments in which he had to analyze a chapter of a science text from the perspectives of the structure and functions of the subject matter (What are the ideas presented, how are they related, and why is this important for students to know?) and with relationship to student development (How would this text presentation connect with students' ways of thinking? Would students have the prior knowledge to make sense of the ideas in the text?). Dave had found the text to be "pretty straightforward," and he "saw no problems with it." He received one of the lowest grades in the class on this assignment and "got nailed" for not attending carefully enough to the connections among ideas, to possible student misconceptions, and to ways in which the text might be problematic for students. Dave's frustrations were not atypical among the case study students, and they reflect the increased complexity of the field tasks during the curriculum course and the changed expectations of the course instructors who pushed students to do deeper analyses than they had done earlier.

Although these struggles and confusions were uncomfortable at times, Dave recognized that they had opened his eyes. For example, at the end of the curriculum course, Dave talked about how the critical feedback from his instructor on his paper coupled with insights gained later from the analysis of the actual curriculum (student learning) helped him see difficulties with the text that he had missed:

> S: When I was going through it (the textbook) it seemed like everything went pretty well, like it would help me. I wouldn't use it as my sole source of information and my sole representation to the students but as a supplement to me. So I saw no problems with it. But I don't have really any experience with that so I couldn't see a contrast between them. So that was really difficult too. And Walt and I talked it over and both of us took it too lightly, the whole assignment because we only, we talked about it for fifteen minutes and came to the conclusion that it was pretty straight forward.

When Dave analyzed a text again as part of the unit planning process during the Spring methods courses, his struggles in the curriculum course played an important role in enabling him to quickly tune in to difficulties students might have with the text:

> Those types of things really made me think a lot about what's going on when somebody reads a text-of what's going on when somebody reads a test or what's going on in the students when he's looking at the words in the book. So just because you have your students read the text, don't assume that they're understanding at all so...If you compared my text critiques from 205...to this one. This one I just ripped it all apart, more than I should have I think, but in the first one I sounded like a pep talk for it because I didn't see its flaws at all. I just saw it as an excellent supplement to my teaching. And now I see that it could reinforce their misconceptions and make it harder for me to teach my students instead of easier. So I think in that aspect it helped a lot.

By the end of the term, Dave was beginning to weave together the learning, teaching, and subject matter curriculum threads in meaningful ways. The set of field assignments in which Dave analyzed his mentor's intentions for a lesson (the intended curriculum), observed the ways in which the lesson was enacted (the enacted curriculum), and interviewed two students to probe their interpretations of the lesson (the actual curriculum) played an important role in focusing Dave's attention on learning issues and in enabling Dave to begin the process of weaving learning issues into his conceptions of good teaching. In his journal he now began to write about and explore in meaningful ways constructivist views of the learner:

> My interviews were very surprising to me. I had assumed the material would be easily grasped...the problems they (students) had...I was certainly shocked by them. What I begin to see now is that children may be able to do very well on a test, but when asked to begin telling what they learned it becomes apparent that they really might not know the interconnections among the facts. It also seem obvious that children can do well on a test even though they have many holes in their schema of the subject matter. It's a very difficult dilemma. (Journal, 2/21/87)

Although Dave had left the learning course with quite limited conceptions of learning theory, issues about student learning now became much more prominent in his thinking. In defining these issues, language initially introduced in the learning course (schema, assimilation, accommodation) became useful to Dave and appeared regularly in his journal writing. By the end of the second term, Dave's focus on the learner and learning was strikingly apparent in his interview. In describing his ideal teacher, Dave listed many features of the ideal teacher that were concerned with views of the learner and the learning process (See Table 5): The ideal teacher can "read" the children well, knows the kinds of questions to ask to test for understanding, is open so students aren't afraid to ask questions, takes things slowly and is aware of learning capabilities of students, recognizes student misconceptions, creates an atmosphere in which students are not afraid to be wrong, puts responsibility on students for their own learning. When asked about ways in which his image of the ideal teacher had changed since the last interview, Dave immediately began to talk about learning issues, suggesting that his mentor did not do all he could in this area:

> Just in the fact that the observation or interpretation of their students...Bill has a few ambiguous questions on tests sometimes...and the students get points off for that, so I think there's, what's changing now is that to me the teacher has to be very alert of his students in order to help them learn. Not just concerned with how they're teaching, but the intricate relationship between the teacher and students, and even on the individual level...Talking with them, why they're getting answers wrong on the tests maybe. And what if there seems to be something that a lot of the students are getting wrong? Have a discussion and find out what they were thinking and what was going on in their heads and the misconceptions they had.

This new focus on student learning, that emphasized paying attention to student errors and a quest for getting in touch with what students understand, raised important questions for Dave about teaching. As he wrote in his journal:

> The entire situation is so frustrating. Bill is a great teacher and is very capable of getting his children on task. But the children still aren't learning what they should be.

Thus, Dave could see that Bill was not the ideal teacher in all ways, but he wondered if it was really possible to do more. In his description of the ideal teacher (summarized in Table 5), Dave drew from issues discussed in Academic Learning courses concerning subject matter knowledge, views of the learner, and teaching approaches to construct a sharper and richer image of a good teacher than he had been able to do during his first term. He was no longer simply describing Bill. He used both his understandings of program themes and his knowledge of Bill's strengths and the realities of his classroom to create this ideal teacher.

Although he was able to articulate a clearer vision of the ideal teacher, Dave left the curriculum course in much the same way he left the learning course - with many new questions and unresolved dilemmas yet to be explored. But, in contrast with his development at the end of the learning course, Dave ended the curriculum course with much deeper understandings of program curricular themes. Ideas initially raised in the learning course were reexplored and took on new meaning for Dave.

Not only did Dave begin to weave together the learning, teaching, and subject matter strands of the foundations courses, he was also successful in weaving these themes into his understandings of classroom practice. While in his first course he had been unsuccessful in using learning theory to interpret his classroom observations, during the curriculum course he had a difficult time separating his experiences in the course and his experiences in the field:

> My priorities seem to be changing with each term varying on what I've been focusing on. Because this term I don't even write down most of the stuff I observed last term. Like I see it once and then I guess it's in my head so I don't bother writing it down, like the more superficial things I was looking at last term...Okay like (last term) why didn't Bill stop a student who was talking or playing (paper) football in the back of the room, something like that. I wasn't worried about that this term. I was more concentrated on how he was putting the information across.
>
> I've almost thought of this class more as going to see Bill and then relating that back to class instead of vice versa. Having the class and this being the complement.

When asked to rate the relative importance of field assignments and work in the course, Dave rated both a 5 out of 5. He explained that he couldn't go into a classroom and get much out of it without the framework and stimulus provided by his courses: "I couldn't have made it on my own." Thus, it was a close interaction between the structure of the field experience tasks and the structure of the course that engaged Dave in actively examining his views of learning and the learner and their relationship to teaching and subject matter.

Foundations into methods. Although Dave was beginning to weave together the curriculum strands of the foundations courses and to integrate them with classroom realities, many of these understandings were still fragile and course-bound as Dave began his spring term methods classes (Science Methods and Content Area Reading). Ideas studied in courses were still only partially developed and were incorporated into Dave's thinking in ways that sometimes seemed more oriented to satisfying course instructors than to satisfying Dave. When asked about ideas in the curriculum course that were confusing to him, for example, Dave responded:

> I'm still a little hazy about the purpose of "functions of the subject matter." I always feel like I'm answering it wrong...student development, structure, and function. I can do them in a specific situation when we're in class but when I'm on my own I always have problems.

These terms and the ideas they represent seemed to be course concepts that were not really part of Dave yet.

But Dave had additional opportunities to explore these ideas in the context of planning and teaching a unit about energy flow in ecosystems to his mentor's students during Spring term. In developing these plans, Dave was required by his methods instructors to analyze the structure and functions of the subject matter he would be teaching, to do a preassessment of student understanding of the topic, and to write an essay describing how he was going to use these three kinds of knowledge (structure, functions, student development) to make decisions about what to emphasize in his unit and about which activities would be appropriate to help students develop conceptual understandings of this content. After his drafts of these sections of the unit plan had been approved, he developed daily plans which his course instructors and mentor teacher helped him evaluate in terms of how well they would appropriately represent the subject matter and connect with learners. After revising the plans and teaching the unit, Dave was required to write an essay analyzing his own intended, enacted, and actual curriculum. This unit planning and teaching process was the focus of his methods classes, and all the readings, lectures, and discussions were designed to inform the unit planning assignment.

By the end of Spring term, Dave was talking about program themes not in course-bound contexts but in ways that reflected that he had constructed his own understandings of them and that they were a part of him. Thus, the curriculum threads had been even more tightly woven into a cloth of Dave's making.

In describing his image of the ideal teacher (see Table 5), Dave's focus was on the learner. Ideas introduced in the learning course that Dave had not integrated into his own thinking initially were now the core of his conception of good teaching: The ideal teacher involves students actively in their own learning, surfaces students' conceptions, involves students in discussing their ideas and in explaining their thinking, etc. But Dave's description of the learner was not an isolated strand of thinking; it was closely intertwined with his ideas about the subject matter and about approaches to teaching. He rarely spoke about learning issues without also discussing how they related to teaching and/or subject matter. For example, his ideal teacher would have students do a lot of writing because this actively involves students in exploring their ideas and in constructing new meanings. The ideal teacher makes subject matter decisions based on real-life applications that will enable students to connect with it (prior knowledge) and see its importance and usefulness (functions). Dave's ideal teacher was no longer simply a carbon copy of his mentor Bill, and it was not a list of attributes that he thought his professors advocated. Instead, Dave drew from both sources to construct this ideal teacher, and he clearly viewed this image as a personal goal for himself:

> I base my instruction a lot off the students drawing their conclusions, maybe to much to the point where they're a little bit lost and couldn't make that scientific inferences. And I think Bill believes you should just tell them what you want them to learn right away which I see now is probably a good idea and then work, you know, integrate both of our methods. Because I don't think Bill, his method of teaching surfaces student preconceptions much. He just tells them and makes sure that they understand his method or his understanding and come as close as they can to that. (Interview #4, 6/2/87)

> Most of all, however, I think I will be more in touch with what we have been studying in class next fall, and with what I observe when watching Bill. Now that I have tried to pull everything together for myself, I see, more than I ever did, how difficult it is to teach for conceptual change. Now, however, I have my own experiences and mistakes to analyze and seek improvements for. (Reflections on Unit Teaching Paper, 5/87.)

Dave's understandings of program themes in personally meaningful ways was also evident in his explanation of conceptual change orientations to teaching. When asked in the interview how he would explain conceptual change ideas to someone who had never heard about them, he responded:

> S: Okay. I've done this before (with friends). First of all we have to, when I first start talking about this to someone I like to tell them, ask them what they think goes on in learning, how you learn something and they usually say modeling, coaching and fading, not in those words but that's what they mean - well the teacher shows me how to do it and I work at it and he helps me a lot and then gradually I do it on my own. And then I ask them, well what do you have to know to be a good teacher? What does it take to really teach someone something? And I talk a little bit about knowing what they know already, some preconceptions and then maybe to show them the flaws in their thinking. You have to understand what a student doesn't understand correctly and create discontent in their thinking. And then I don't want to make it sound like I'm just telling them the definition of things but basically you have to know what a student learned, what a student

> knows, what he doesn't know correctly and what he has misunderstood, show them, show him a way, in such a way that he sees that and then present him with the correct way of thinking and help him work along to seeing that correct way and seeing how it's more useful.

Thus, Dave completed his first year of teacher preparation and entered student teaching holding a well articulated conception of conceptual change teaching. Building this framework for thinking about learning, teaching, and subject matter was a gradual process that required Dave to make significant changes in his conceptions of teaching and learning. Early field experiences played a critical role in this conceptual change process. They were occasions for Dave to make explicit and examine his preconceptions, and they challenged his current thinking. These early field experiences were carefully structured, sequenced, and scaffolded by faculty and by the mentor teacher to engage Dave in recognizing and resolving important issues and dilemmas in linking theoretical and research-based ideas with practical knowledge of the classroom.

Learning-to-Teach As a Process of Conceptual Change

Dave's pattern of change across the first year in the program was typical of the 12 focal students in this study. Students entered the program with their own conceptions of teaching and learning, identified gaps in these views, struggled to make sense of alternative, conceptual change perspectives, and modified their entering conceptions accordingly. Students went through this process at differing rates, and they were more and less successful in making significant changes in their entering views. But the closely linked structure of the field and course assignments was critical in engaging all but one of them in challenging and reconsidering their own views in light of the conceptual change research base.

In Dave's case, his entering concerns about whether he wanted to be a teacher played an important role in the sense he made of concepts and experiences in the learning course. These personal concerns drove his interpretations of course concepts and influenced his decisions about which ideas to explore most deeply. For Dave, the learning course raised questions not about learning but about teaching. After this period of question-raising, Dave entered a period of frustration and confusion (conceptual conflict) as he was encouraged by curriculum course instructors to struggle further with his own questions about teaching and to raise and explore dilemmas concerning learning and subject matter issues that he had not grappled with extensively during the learning course. Dave received critical support in resolving this conceptual conflict from a series of field assignments that were closely intertwined with ideas being discussed in the curriculum course. As his experiences in the curriculum course and in the field became more closely linked, so did Dave's understandings of ideas initially introduced in the learning course. Some of the confusion was resolved as he began to put the curriculum themes together into a much clearer yet still tentative framework for thinking about good teaching. This framework was later strengthened as it was transformed into a useful conceptual tool for planning, teaching, and analyzing a unit of instruction. Thus, Dave's understanding of conceptual change views of learning and teaching deepened and became more personally meaningful as he had opportunities to use them in planning, teaching, and analyzing his own instruction.

Features of Early Field Experiences that Supported Prospective Teachers' Conceptual Change

The early field experiences had an important impact on each of the 12 case study students. Analysis of the ways in which the field experiences contributed positively to these prospective teachers' conceptual change revealed four critical features:

1. Close links between field experiences and curriculum themes developed in foundations courses. There are two ways in which the field experiences and the curriculum themes of the Academic Learning courses were closely interwoven. First, the field experiences were carefully designed to focus perspective teachers' attention on curriculum themes being developed in the course sequence. For each field assignment, students were prepared in the Academic Learning courses to use a particular perspective, or interpretive lens, for analyzing the classroom. Dave and other prospective teachers reported that without this perspective they would have observed classrooms superficially and would not have "seen" the complexities, dilemmas, and critical features of teaching for conceptual change. Thus, the perspectives served an important role in creating cognitive conflict for the Academic Learning students.

Second, these links between the curriculum themes and field experiences were strengthened as prospective teachers were encouraged in the Academic Learning courses to talk and write about their experiences in the classroom. In class discussions, the prospective teachers could ask questions that their field visits had raised for them about the curriculum themes. Through these discussions and through interactive journals, course instructors communicated to students that they should be raising doubts, identifying gaps in theoretical perspectives, and taking a questioning stance about theory and research studied in their courses.

The close links between the field experiences and the curriculum themes could not have been meaningfully explored by students if the new field assignments had been tacked on to the courses as "extras." Instead, the field assignments were embedded in the courses and served as the core experiences for exploration of course concepts and themes. This was clearly reflected in Dave's comment that he viewed the curriculum course as "going to see Bill and then relating that back to class". He explained that the course served to help him better understand his classroom visits instead of the other way around. Other case study students explained that "you can't really separate the course experiences and the field experiences".

2. Scaffolding of the field experiences. The field assignments were scaffolded first by the Academic Learning faculty, who prepared students to bring particular interpretive lenses to their experiences in the classrooms. The faculty initially scaffolded these experiences through the structure of the field assignments and through careful guidance in preparing students to carry out these assignments. In the field, students received scaffolding from mentor teachers who helped students reconsider theoretical and research-based conceptions of teaching and learning in light of particular classroom realities. After field visits, Academic Learning students received further scaffolding from course instructors who reacted to students' experiences in the field through class discussions, interactive journals, and responses to students' papers. Over time, the nature of this aspect of faculty scaffolding changed. In the learning course, for example, faculty reacted to students'

field experiences by encouraging students to raise questions and by accepting students' puzzlings about these questions even if important opportunities to link course ideas to the field had been missed. Instructors' comments on student papers were usually in the form of questions designed to encourage students to consider alternative views. In the curriculum course, however, course instructors' feedback did more than just raise questions. Instructors also clearly pointed out missed connections and gaps in students' understandings of course themes. Students were encouraged to revise and resubmit papers to address these issues. Thus, course instructors took a more directive role, which they felt was necessary given the increased complexity of the field tasks. Students were now being expected to use multiple interpretive lenses and to begin to see the relationships among these lenses. Although this extra scaffolding was at times uncomfortable for students, it also played a critical role in deepening many students' understandings of the curriculum themes and of a conceptual change approach to teaching. Dave's difficulties with the textbook critique, for example, represented a turning point in his appreciation of the differences between his entering conception of good teaching (and good textbooks) and what it takes to teach for meaningful conceptual change.

3. Cumulative nature of the field experiences. Successes in knitting together course themes and field experiences and in mentor/faculty scaffolding of field experiences were enabled by the cumulative nature of the field experiences. The field experiences were not isolated experiences but were an integrated set that enabled prospective teachers to develop increasingly more complex understandings of both conceptual change conceptions of teaching and

classroom realities. The earliest field assignments focused prospective teachers' attention on isolated aspects of the classroom, such as an individual student's learning in one subject area. Later, students re-explored ideas about the learner and learning theory in a more complex task that required them to analyze the relationship between the teachers' intended curriculum and the students' actual understandings. Dave and the other case study students had quite superficial understandings of constructivist views of the learner after the initial field assignment, but these understandings deepened as they were revisited first in the curriculum course and later in methods classes. The initial field experiences in the learning course were essential in beginning Dave's conceptual change, but they were not sufficient. The opportunities he had over the first year to revisit both the field and program themes were critical in enabling him to construct a new conception of good teaching that was personally meaningful to him and that he carried into student teaching.

4. Multiple strategies for encouraging student reflection about the links and tensions between theory/research and classroom realities. Another critical feature of these early field experiences was the multiple opportunities students had to reflect about the links and tensions between theory/research and classroom realities. Students wrote in interactive journals with their course instructor in each term across the first year. In the journals students were encouraged to reflect on dilemmas they faced in coming to understand their mentor's classrooms from perspectives discussed in class. The formal papers students wrote for courses also were designed to encourage student reflection on the links and conflicts between theory/research and practice. Finally, students were encouraged to talk in class and with classmates and mentors

outside of class about these issues. In his interviews Dave (like most of the case study students) talked about the value of these varied opportunities to reflect on his developing understandings. He valued what he had learned from writing in his journal, and from writing about his field experiences and from talking with his mentor, his classmates, and his professors. He did not view this writing and discussion as busy work, but saw how much it contributed to his own understanding. He talked in each of his interviews about the critical role this reflective writing and discussion was playing in helping him understand conceptual change teaching and in helping him understand his own learning. In his final interview right before graduation, he identified this reflective approach to his own learning as one of the most important understandings he had developed from his experiences in the Academic Learning Program:

> ...to think about how you're changing, you're coming up with different things... Because we had to go back and analyze everything we did, so possibly one of the less conscious things that we were doing in the program was seeing how you developed...to clarify it more in your mind and from our profs... It helps you to think about your development and that we should always be growing...

Conclusions

The early field experiences in this teacher education program played a critical role in fostering significant conceptual change in 10 out of the 12 case study students during the first year in the program. Analysis of these cases shows ways in which early field experiences can be truly educative in challenging prospective teachers entering conceptions of teaching and learning and in deepening prospective teachers' understandings of theoretical and research-based conceptions of teaching and learning. In this model of early field experience, learning-to-teach is viewed as a process of conceptual change, and field experiences serve as a critical setting for challenging prospective teachers' assumptions about teaching, learning, and the subject matter of school curriculum and for helping them make sense of alternative, research-based perspectives. Experiences in the field are designed to engage prospective teachers in grappling with the conflicts between traditional teaching practice and views of teaching practice suggested by theoretical/research-based knowledge. The field experiences are organized as a set of field tasks that are carefully structured by faculty and mentor teachers to guide students' developing understandings of a few curricular themes that are revisited and re-explored in increasingly complex ways over time.

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V.

B. LEARNING TO PLAN AND TEACH WITH A CONCEPTUAL CHANGE ORIENTATION

Prospective Teachers' Developing Understandings and Use of a Conceptual Change Orientation To Planning and Teaching

The Problem: Prospective teachers' failure to value and use a conceptual change orientation during student teaching

The teacher education literature is replete with reports of prospective teachers' utilitarian focus during student teaching: their primary focus on management issues, their failure to plan beyond the day-to-day, and their tendency to copy the cooperating teacher rather than to draw on research-based strategies taught in their teacher education courses (Iannoccone, 1963; Fox et. al., 1976; Friebus, 1977; Tabachnick et. al., 1982). Thus, student teaching has typically not been a time when students apply research and theory to teaching practice. Rather, it is often a time for rejecting such knowledge as impractical.

Such a pattern was identified by faculty as a weakness of the Academic Learning teacher education program in 1985. Although the faculty provided opportunities for prospective teachers to develop gradually deepening understandings of a conceptual change research base through a 3-4 term course sequence prior to student teaching and although students seemed to have reasonable understandings of that research base, there was a large gap between the students' understandings and their actions as student teachers. Instead of using the conceptual change research as a framework for thinking about curriculum, teaching strategies, and student learning, student teachers were immediately struck by how much they didn't know about the practice of teaching. From a long list of practical problems that captured their attention, the problem that Academic Learning students found most salient was how to manage the classroom. They generally relied on their cooperating teachers' behavior in this area. The cooperating teachers typically gave many specific tips to solve immediate problems ("Move Janie to the back of the room"), without helping students develop a conceptual framework or philosophy for thinking about such actions.

The cooperating teachers were unaware of the program's research base, so they did not encourage Academic Learning students to use that as a source of specific teaching strategies, as a basis for planning and reflection, or as a way of understanding or addressing classroom management problems. In fact, the teachers' beliefs and implicit theories about teaching sometimes ran counter to a conceptual change perspective. While the cooperating teachers and student teachers focused on day-to-day trial and error solutions to practical problems, the Academic Learning faculty serving as student teaching supervisors pushed students to look at the big picture, to think hard about what students should be learning, to analyze what students actually thought and understood, and to plan lessons that would foster meaningful, conceptual change.

Thus, the student teaching supervisor and the cooperating teacher were often working at cross purposes (Feiman-Nemser and Buchmann, 1983), and the student teacher was caught in the middle trying to please both parties. In the process, using research knowledge and a conceptual change theoretical framework in teaching and using practical knowledge in teaching became set up as mutually exclusive alternatives. The Academic Learning students typically came to value the cooperating teacher's practical advice and to reject the usefulness of conceptual change frameworks. Good teaching became synonymous with good managing. Practical solutions to immediate problems were highly valued, and conceptual change ideas were seen as idealistic and irrelevant to "real" classrooms. As one student (Class of 85) described the program after her student teaching: "The content (conceptual change) is so hypothetical. It's wonderful to talk about and beautiful to visualize, but it's not practical...It's much too theoretical." (Mattson, 1985). 61% of the Class of 86 students responding to a questionnaire at the end of student teaching described management, practical and bureaucratic issues as their most important learning during student teaching and did not mention important learnings in the areas of planning and teaching.

The mentor teacher field component that was developed and piloted during 1986-87 was designed to support students in linking their understanding of conceptual change ideas with their understanding of real classrooms and curricula. The goal was to have students learning simultaneously from both research and practice throughout their two-year teacher education program. With specially designed field assignments and support from both faculty and mentor teachers, students would be able to integrate study of conceptual change research and the practical knowledge gained in the classroom. We wanted to find out whether the development of understandings of the conceptual change framework in this integrated way would result in student teachers' valuing of that framework and in their ability to use that framework in their planning and teaching during the student teaching experience.

Impact of the Mentor Teacher Project: Changes in Students' Valuing and Use of Conceptual Change Orientation During Student Teaching

Analyses of 11 case study students' experiences during and after student teaching and analyses of questionnaires and group interview data from other members of the Class of 88 cohort reveal an important shift in Academic Learning students' valuing of a conceptual change orientation and in their ability to use such an orientation in planning and teaching during student teaching. These successes show that it is possible to change the dismal pattern of student teaching, but that it requires appreciating the difficult and complex changes prospective teachers must undergo and taking a programmatic approach to supporting these teacher candidates through that conceptual change process. The case study students' developing thinking and teaching provided important insights about what it takes to help prospective teachers make such changes.

Valuing of a conceptual change perspective. Evidence from a variety of sources shows that the Class of 88 students ended student teaching valuing a conceptual change orientation to teaching. In contrast with Class of 86 students, these students did not view the ideas and strategies taught in Academic Learning courses as too idealistic for use in "real" classrooms. Instead, their responses in both interviews and questionnaires revealed an understanding of a conceptual change framework that was much more tempered by and linked to reality than the understanding of earlier cohorts. Although each student held different understandings of this framework and emphasized different aspects of it, nine out of the eleven case study students who completed student teaching described the importance of having a conceptual change orientation for thinking about teaching and learning. They also acknowledged the complexities and challenges that this perspective implies for classroom teaching. For example, when asked to describe their most important areas of learning during student teaching, Barbara and Marian talked about the importance and difficulties of teaching for conceptual change:

> Marian: Well, for one thing, I learned that a lot of the stuff we learn in the classes now has application, I think. You know, a lot of times you sat there and you thought, well this all sounds good. But then once you get in there and really have to start dealing with the kids, then a lot of the things start coming a lot clearer, like the conceptual change. You begin to see how hard it really is to get people to make those changes in their minds, and how much planning has to go into it to get it, to come even close and then, you have to realize that it's not going to happen overnight, either...
>
> Barbara: Another important thing I learned is how difficult it is going to be as a beginning teacher teaching for conceptual change. There were days when I thought I did a pretty good job of that and then there were other days I just go so bogged down by everything else that was due and had to get done that it didn't. It was in the forefront of my mind, and that bothered me. I learned that I am still excited by teaching, and I really want to be a teacher.

Non-case study students wrote responses to questionnaire items that reflected a similar valuing of conceptual change ideas along with an understanding of how difficult it is to achieve conceptual change ideals. Despite the difficulties these students identified, they did not abandon the goal of striving to teach for conceptual change. Rather, their responses reflect recognition that they are just beginning to learn to teach and an assumption that they will become better able to realize these goals as they gain experience. In responding to an end-of-student-teaching questionnaire item, for example, 50% of the respondents (n=28) did not list any ideas or strategies taught in Academic Learning classes as being unrealistic. An additional 32% agreed that the ideas/strategies emphasized in Academic Learning are realistic and important, but they elaborated ways in which classroom contexts (especially time constraints) make these goals difficult to achieve. They also identified ways in which these ideas and strategies need to be modified in classroom use:

> Item: Are there ideas/strategies you were taught in Academic Learning classes that you think are unrealistic for use in "real" classrooms? If yes, give an example and explain why.
>
> . . . .
>
> Teachers have schedules and deadlines (unfortunately!) which make it difficult to spend a lot of time on one unit. This will probably change as I become more experienced and can manage my time better. (Elementary major)
>
> Most of the strategies were realistic, at least if you look at them more for the philosophy of teaching. Every strategy must be modified by each individual teacher in each individual school and classroom. (Secondary science major)
>
> I can honestly say that I don't think any of the strategies are unrealistic. Not all can be used completely. As I have said, a teacher must take bits and pieces of information from all sources. This program seems to be based on valid research which gives it a link to the "real" classroom or "real" world. Teachers just have to be willing to work harder to use some of the ideas. (Secondary math major)
>
> I'm not sure yet. I think they (conceptual change ideas) are a slower method but more effective. I want to pick a school to teach in that has less of a time crunch so I can experiment more. There will always be curriculum to cover (If this is Tuesday, it must be bacteria!), but I don't want to have to match 4 other teachers on Jan. 15th. I would rather cover what I can and back up my slowness with a solid understanding in the kids. (Secondary science major).

Thus, these students acknowledge constraints and difficulties in using a conceptual change orientation, but they do not reject it. Only one student in the Class of 88 group wrote a response to this question that seemed to reject the conceptual change orientation as too idealistic. This secondary English major wrote:

> There's a lot of talk about individual attention, cooperative teaching, and constant monitoring for comprehension. After student teaching, I've come to the conclusion that class size, teacher competitiveness, and simple lack of time make these things impossible.

Using conceptual change frameworks during student teaching. Analyses of the case study student data collected during student teaching (interviews, classroom observations, analysis of unit and lesson planning) focused on the extent to which these students showed evidence of using a conceptual change orientation in their planning and teaching. In this analysis, we did not expect to find student teachers to be implementing conceptual change strategies smoothly, and we did not expect that their efforts would necessarily be dramatically effective in terms of student learning. Instead, we viewed these student teachers as beginners and looked for evidence that they were attempting to draw from the research studied in their courses in their planning and teaching, and to reflect on their teaching from a conceptual change perspective. In particular, we looked for evidence that their student teaching behaviors were different from students in earlier cohorts of Academic Learning student teachers. Table 5 presents a list of guidelines that we used to identify student teaching behaviors that were consistent with program goals. The left column represents behaviors we looked for; the right column presents more typical behaviors that we had seen in previous cohorts of student teachers.

Observations of the case study students during student teaching by mentors, by student teaching supervisors, and by outside observers along with analyses of the students' thinking (interviews, reflective essays) and planning (planning documents, interviews) revealed some success stories. Using data from these various sources and persons, we identified 5 of 11 of the case study students who completed student teaching as strong, positive examples of beginning conceptual change teachers. Mentors, student teaching supervisors, and observers evaluated these students as teaching, behaving, planning, and reflecting on their teaching in strikingly different ways from typical student teachers:

> Well I think one of the things that I evidenced, you know, that I saw evidence of from her and that I didn't see anything before (with other student teachers) was the integration of all of the subject areas, all the content areas throughout the day. She really did a great job of integrating everything, all day, and almost every day, so that she never really taught a separated isolated unit and then her science unit some things she incorporated, the math and the language arts and things all into it. (Barbara's mentor, 4/14/88 interview)

> She certainly has a very clear understanding of what she wants the students to learn,... And she thinks a lot about that and she is very clear about that and she is able to think quite deeply about it... And she very much uses the structure of what she wants the students to learn and builds around that, the main ideas and so on. And I think that's the starting point and then she develops the materials and the kinds of activities that she wants to work with and defines the tasks that she is going to have the students do and she thinks about those in terms of this modeling and coaching and fading aspect. So, and in terms of daily planning, she uses then her unit outcomes or you know the tasks and main ideas and so on there and she attends and usually knows very much where the students are. I mean she gauges where she is going next by how they have done with what has been developed to that point, and she takes into account the general characteristics of these kids. (Barbara's Supervisor, 3/16/88)

> The things that make him a conceptual change teacher are the ability to construct good general unit plans...He has a good sense of where the students are...I think he's good at responding to students when they say things or do things that indicate conceptual problems. He's good at, if it's a conceptual problem then he knows about, you know...He's pretty good at zeroing in on it and figuring out, hey this is the problem they're having and so I need to figure out a way of doing something about that. When it's a problem that hasn't been defined beforehand, you know, it's just sort of cropping up. Here's this kid that's saying something weird, what do I do about it? He's not as good in that situation, but hardly anybody is. So those are the things that would put him toward the conceptual change end. (Dave' Supervisor, 12/14/87)

While all of these students had typical beginning teacher management problems and while they all at times looked like very conventional, didactic teachers, each of them consistently made efforts to help students develop deeper, conceptual understandings of subject matter. In contrast with typical student teachers, each of these student teachers exhibited the following behaviors on a regular basis and were able to describe these behaviors in their interviews:

-- developed conceptually focused long-range learning goals and used these goals to focus on central concepts/problems rather than trying to cover content broadly and superficially.

-- linked daily lesson plans to unit goals and integrated concepts across units (even across subject areas at the elementary level)

-- tried to deepen their subject matter understandings in the planning process by seeking out advice from mentors, supervisors, and other sources

-- revised teaching plans in response to students' responses and difficulties

-- provided opportunities for students to be actively involved in their own learning (not just listening to the teacher or filling out worksheets)

-- asked students to apply knowledge to everyday events

-- used multiple methods to track student understanding

-- reflected on their teaching efforts in terms of student learning and were willing to acknowledge failures; sought out and welcomed opportunities to analyze their teaching and students' learning with their mentors/student teaching supervisors

-- talked about conceptual change as a demanding, challenging, but exciting framework for thinking about teaching.

The unit planning process as a key program experience. What enabled these students to value the knowledge they had gained from Academic Learning course experiences and to act on that knowledge in meaningful ways during student teaching? In the interviews, questionnaires, and group discussions at meetings, all three groups of program participants (students, mentors, faculty) pointed repeatedly to the unit planning process which was begun in methods courses and carried through student teaching consistently by the most successful students. Students and mentors alike identified the initial unit planning and teaching experience during Spring of the first year as a particularly critical turning point in students' understanding of the complexity of planning and executing lessons that run smoothly and also are focused on teaching for conceptual understanding.

Because this group of students differed dramatically from students in previous classes in terms of their valuing and use of program goals during student teaching, we analyzed the ways unit planning experiences for this group of students differed from those of Class of 87 students (the cohort that piloted the new field component and were the first Academic Learning students to work with mentor teachers). Although the Class of 87 students rated the Spring term planning and teaching experience as important to their growth, they did not continue to value and do that kind of planning during their student teaching. What features of the unit planning process for Class of 88 students can explain its greater impact for this group?

There are at least three ways in which program experiences were structured differently for Class of 88 students, and each of these changes provided increased support in fostering students' ability to link their understandings of program themes and conceptual change with their classroom-based understandings.

1) Program themes developed in the first two foundational courses were explicitly linked to the subsequent unit planning requirements. Thus, the seeds of the unit planning process were sown early, and the ways in which those seeds and program themes were related to the unit planning process were made more apparent to the Class of 88 students.

For example, students drew concept maps on several occasions in the curriculum course during the second term in the program to analyze the structure of the subject matter content of lessons or textbooks. In the past, students viewed this concept mapping and analysis of subject matter structure as intellectual tasks and did not see the relevance of this to planning and teaching. In the revised field sequence for the Class of 88 cohort, however, the purposes of concept mapping were made more explicit and connected to the planning process. In the curriculum course, students were encouraged to use concept maps to identify the structure of the subject matter in lessons they observed, and to describe ways in which students understood the subject matter. In unit planning during methods courses and student teaching, students were required to analyze and represent the structure of the subject matter knowledge to be taught. Concept maps were suggested as one way of accomplishing this, but other strategies were also possible. An important key here was using the same language in both the curriculum course and the unit planning to describe the purpose of the task: To analyze the structure of the subject matter, highlighting central concepts and connections among ideas. The following quotes from Barbara, an elementary major, illustrate how her understanding and valuing of concept mapping deepened as she linked it to her actual planning and teaching, first during a science methods course and later during student teaching:

March, 1987: End of the second term curriculum course:

> B: Because the first two weeks (of the course) sounds like, well why are they doing this? It is kind of ridiculous. Okay, half an hour more of class, time to go home. And (the instructor) would keep drawing these concept maps. So what? Why would he be drawing these concepts maps and then I started to realize why...Part of it is, he loves concept maps (she elaborates on this)...One way of really, clearly looking at students' misconceptions and seeing them is

> drawing out how they would map a concept. How they would map animal movement. That really helped me when I was working on my paper concerning the intended and the actual curriculums, because I was amazed that this worked. Because I had mapped out what I saw the subject to be, and I thought that was really neat how all the pieces fit together. And then I talked to the students, and I could map out how I thought they saw it. And I thought that was really helpful, that was a way of organizing new relationships without just making it a linear relationship. And that is where I started to see the value of concept maps. And also it helps me when I want to see how my understandings relate to each other, draw a concept map. (emphasis added)

June, 1987: End of spring term (end of first year), after unit planning and teaching experience in science methods:

> B: The concept maps. I can still remember how much I intensely disliked them at the beginning of 205. I thought they were ridiculous, why am I doing this? Once I started planning my lessons (in science methods) I quickly saw how valuable they were...That's what we based our unit plan on. Without that concept map I wouldn't have the objectives that I had. It allowed us to structure it so it had a good sequence of lessons. We could take one look at the concept map and know we knew enough about the content if we knew how things connected and interrelated. (emphasis added)
>
> I: So you see that as a valuable way that you would use in your own planning?
>
> B: Yeah, definitely. I think I would especially use it in an area I wasn't sure of, because through that process I would really become aware of what things I was shakey on, the connections and relationships between. (emphasis added)

March, 1988: End of student teaching:

> I: And you mentioned originally, a central focus and the concept map as being most important (pieces of the unit planning) to you. Why were those two particularly important?
>
> B: The central focus because it was like the theme of your unit, and you had to seriously think about what the focus the unit was going to take, which was good. And the concept map because, this is so funny, because when (the instructor) first started doing all this, I thought, "What is this man doing?" Now two years later, I think they are great. You can, first of all, it forces you to sit down and figure out what you think the connections are and as you do that, you realize what you need to work on or what you are not really quite sure of. And also it gives you a frame for what you want the students to eventually pick up, although usually their concept maps aren't

> as sophisticated as the ones I do. It is just a really systematic way of organizing everything so that the pieces are linked together. (emphasis added)

> I: As you were planning units this term, did you find areas in which you needed to get clearer on some things?

> B: Yeah. We did a unit, (my mentor) wanted me to do a unit on birds, and I said fine, I love animals. Well, for two weeks I had my head stuck in every bird book that I could find, because I didn't know anything about birds. And I never had studied about them, and so I must have drawn, I don't know, eight concept maps before I finally got to one that I thought was reasonable. But I attempted to do one at first (before reading) - when I looked at it I laughed and threw it away.

> I: So you initially tried it without...

> B: Yes. What do I know about birds? They fly, and they have feathers I thought, "these kids already know this. I better..." But it was interesting because as I did that, I got really excited about it.

These quotes show that during the curriculum course, Barbara's focus was on using concept maps to study students' misconceptions. As she used concept maps during science methods and student teaching, however, she identified multiple ways in which this tool enabled her to plan and teach more effectively: to identify gaps in her subject matter knowledge, to define objectives, to sequence and link daily lessons, and to assess student understanding.

Thus, Barbara was supported in using a tool and a conceptual framework (analyzing structure of the subject matter) initially introduced in the curriculum course on repeated occasions of planning and teaching units in methods courses and during student teaching. If she had simply been required to do a concept map in her planning during student teaching without the prior development in the curriculum course, the task would have been meaningless; she would not have appreciated how concept maps could help her explore her subject matter knowledge, identify gaps in her subject matter knowledge, and compare expert knowledge with students' cognitive structures. Likewise, if Barbara's work with concept maps in the curriculum course had not been later re-explored in the context of unit planning and teaching, she would not have continued to deepen her analysis of subject matter in planning to teach, and she probably would have recalled concept mapping simply as a puzzling exercise done in one course by one zany professor who "loved concept maps."

The early "seeds" of the unit planning process played a critical role in Barbara's, and other students', eventual success in developing conceptually-focused, long-term plans during student teaching.

2) Class of 88 students had more opportunities and encouragement early on to link the unit planning process to the realities of teaching practice. The course instructors and mentors played a more active role during methods courses and student teaching in helping Class of 88 Academic Learning students consider practical issues as well as conceptual, theoretical issues in planning and teaching.

For example, in response to criticisms from previous students and from the mentor teachers that classroom management and discipline issues were being ignored, faculty members built these issues into the methods courses and the unit planning process. In the spring term of the first year as students developed their first units, they also read and discussed articles about classroom management. In discussing these articles with students, faculty members emphasized the importance of planning meaningful tasks for students as a way to avoid classroom management problems. However, the faculty also acknowledged that despite excellent subject matter planning, problems might develop, and they spent class time helping students understand alternative responses to problems and the implications of different responses.

In addition to this faculty support, students were required to talk with their mentor about management issues. Mentors reviewed students' daily plans for the unit and helped students consider many details that would contribute to smoothly run lessons: How are you going to pass out and collect materials and papers? What will you do if you finish early? How are you going to divide students into groups? What will you do if students start playing with the materials? How can you help students keep track of the 4 steps in your directions? For most Academic Learning students, this was an eye-opening experience.

During and after the unit teaching, students also had opportunities to talk with both their mentors and their course instructors about these practical issues and ways in which they related to accomplishing unit objectives. Mentors observed the lessons and provided immediate written and verbal feedback about both management and instructional issues. In the methods courses, faculty encouraged students to talk about management problems they encountered. In such discussions students raised and explored important dilemmas in linking conceptual change ideas to real teaching: If the mentor manages the classroom by demanding absolute silence and independent seatwork, is it possible to involve students in small group, cooperative work? Is it worth trying a new approach with the students in this unit, and what would it take to implement such a change effectively? These and other interesting dilemmas were raised in a setting where students could be supported in using conceptual change frameworks to explore them. Thus, management issues were not viewed as separate from teaching goals and strategies. Academic Learning faculty also encouraged students to consider practical as well as theoretical issues in their reflective essays about their unit teaching experience. In these essays students analyzed student learning and the strengths and weaknesses of all aspects of their teaching - including management issues as well as conceptual issues.

Another way in which faculty helped students deal with practical issues was in the structure of the unit planning requirements themselves. The Class of 87 students viewed unit planning as a tremendously time-consuming, writing assignment done for methods classes but impractical to accomplish on a regular basis during student teaching. Thus, they viewed unit planning as a course-bound exercise. Faculty decided that the extensive study and writing that these students had done for their first unit (in methods class) played an important role in developing their understandings of the program's curricular themes. Therefore, students in the Class of 88 faced similar demands in their initial unit planning experience. However, faculty made clear to students the reasons for this extensive writing, and they emphasized that students would streamline this process when they were faced with teaching multiple units during student teaching. A modified version of the unit planning requirements was then used during student teaching for most student teachers. This version reduced the amount of writing that students had to do but still focused students' attention on key issues in the planning process - analysis of structure and functions of the subject matter, consideration of student development and prior knowledge, instructional tasks that focused on central concepts, etc.

Thus, in contrast with previous groups of students who got the message that unit planning was an intellectual, course-bound exercise in designing ideal plans, the Class of 88 cohort was actively challenged to consider practical classroom issues from their very first efforts to develop and plan a unit. The elementary majors had several opportunities to go through this process prior to student teaching, studying management issues in conjunction with unit planning in their science methods course (Spring of the first year), the interdisciplinary curriculum course (Fall of second year), and their social studies methods course (Fall of second year).

3) Class of 88 students received more scaffolding and support in their efforts to plan and teach conceptual change units during student teaching. Analysis of data collected on Class of 87 students during the piloting of the new field component revealed that the field experiences were carefully structured and scaffolded by both course instructors and mentor teachers during the students' first year in the program. However, during their second year, such scaffolding was largely absent in elementary students' practicum work and during student teaching for both elementary and secondary students. In contrast with the notion of "fading" supports over time (Collins, Brown, and Newman, in press), we had been suddenly removing the supports at a point in time when students faced the most complex task of all: Putting together all they had learned from both practice and study in the context of daily teaching and planning demands. The most successful Class of 88 students received scaffolding of three different types in their efforts to plan and teach conceptually-focused units during student teaching: Scaffolding embedded in the revised student teaching planning requirements, scaffolding from student teaching supervisors that focused on the development of unit plans, and scaffolding from their mentors.

Scaffolding embedded in planning requirements during student teaching. As described above, unit planning requirements during student teaching were streamlined so that it was reasonable to require students to use this format on a regular basis during student teaching, for each unit they taught. This stands in contrast with requirements for the Class of 87 students to plan and teach just one unit using the more elaborate requirements. Class of 87 students reported that the unit planning requirement during student teaching was done to please "the program" and did not influence how they planned on a routine basis. In contrast, Class of 88 students consistently reported that the planning format guided all their planning during student teaching and would continue to guide their planning after graduation. They could talk about the various pieces of the planning requirements and their importance in ways that reflected how this process had not been reduced to a set of steps memorized to pass student teaching but had been modified and incorporated into each student's thinking in personally meaningful ways.

Faculty scaffolding of the unit planning process. The exemplar case study students in the Class of 88 group received critical faculty scaffolding of their planning efforts both before and during student teaching. Prior to student teaching, the Class of 88 elementary majors planned more units as part of their methods courses than Class of 87 students had done. In addition to developing unit plans as course requirements for science and social studies methods classes, the Class of 88 cohort also developed two unit plans as part of their work in the interdisciplinary curriculum course the term prior to student teaching. Thus, they entered student teaching with at least two unit plans well underway. In each of the courses requiring unit planning, for both elementary and secondary majors, students received extensive support and feedback from course instructors. Students wrote and revised drafts of plans and often met with course instructors individually or in small groups of students working on the same topic. Course instructors reinforced the importance of each piece of the plan and its reason for being included.

In conjunction with the revised planning requirement during student teaching, the role of the student teaching supervisor also changed. Student teaching supervisors' primary responsibility shifted from observations of lessons to oversight and support in the development and revision of student teachers' unit plans. Because most of the student teaching supervisors were faculty who had subject matter expertise in a particular area and who also taught courses in the program, their involvement in the unit planning process pushed students to examine closely their subject matter knowledge and to develop units that held promise for promoting meaningful conceptual change. Thus, the student teaching supervisors spent considerable time at the beginning of the term in unit-planning sessions with student teachers. Observations later in the term focused on analysis of the observed lesson in the context of the overall unit plan. The involvement of the supervisor in long-term planning provided a much richer context for the observations, permitting a single observation to be discussed in relationship to ongoing instruction. This supervisor support helped exemplar students deepen their understanding of conceptual change themes and how to incorporate these ideas into planning. For some students, the supervisor's role was critical in pushing them to reconsider the usefulness and purposes of the various pieces of the planning process.

Mentor scaffolding. Each of the mentors working with the five most successful Class of 88 students had also piloted the field component in their work with a Class of 87 student. These mentors contrasted the kinds of support they were able to provide their second student with the support given to the first student. The Class of 88 students benefited from their mentors' increased knowledge and understanding of Academic Learning Program goals. Thus, these teachers acknowledged that with their first students, they had focused primarily on making sure that they knew the procedures and requirements to help the students complete the field assignments. In the process of working through the program sequence with their first students, they gradually came to understand and more actively support the curricular emphases in the Academic Learning Program. With the Class of 88 students, this group of mentors valued the unit planning process, supported their students in developing plans, and were open to Academic Learning faculty members' suggestions about the unit plans.

During unit planning and teaching experiences during methods courses and student teaching, these mentors provided suggestions about activities and materials and reacted to students' overall plans. Once the overall unit plans had been shaped and approved, mentors played a particularly important role in reviewing daily plans within the context of the long-range plans. They were more insistent in seeing these plans ahead of time than they had been with their first student. Seeing plans early enabled mentors to feel more comfortable in suggesting substantive rather than just procedural changes. Without this daily support of the mentor teacher, the supervisor's efforts in the unit planning could not have lasting impact. Thus, student teaching supervision became much more of a joint, collaborative process.

Insights from analyses of less successful students

While the most successful, exemplar case study students helped us identify important features of the program, analysis of the students who made less progress in understanding and using program themes also provided important insights. These cases help us understand ways in which individual student characteristics play a role in the learning-to-teach process and to explore gaps in program experiences that were critical for particular students.

Five of the less successful case study students made impressive gains, but their use of conceptual change frameworks was not evident in all three aspects of teaching, planning, and reflection/analysis. Each of these cases provide different insights into the learning-to-teach process.

Two elementary majors fit into this category. In the case of Sarah, serious difficulties in getting the cooperation of a challenging group of fourth graders prevented her from meaningfully implementing some excellent unit plans. Despite daily teaching that was characterized by a continual struggle to maintain order, this student's planning and analysis of her teaching consistently reflected both a valuing of conceptually focused instruction and an ability to translate that perspective into meaningful plans. Her case raises interesting questions about contexts for student teaching, about gaps in the conceptual change framework (particularly in helping students analyze and learn to manage the social aspects of the classroom), and about the role of the mentor.

Another elementary major, Teresa, began the program with limited understandings of and interest in subject matter. She also entered with more simplistic and entrenched views of teaching and less of a disposition to be analytical and reflective than the other case study students. Although she had further to go than the other students and did not develop deep understandings of program themes, she did make important progress. For example, she had assumed from the beginning of the program that her mentor teacher was the ideal teacher, and throughout her first year she consistently interpreted her mentor to be using conceptual change teaching approaches. By the end of student teaching, however, she could analyze ways in which her mentor differed from the conceptual change ideal. She also made important progress in recognizing the kinds of subject matter knowledge she herself needed to gain in order to be a more effective teacher.

Tom, a secondary science major, in some ways exemplified the ideal conceptual change teacher. He had a strong, conceptually focused subject matter background, he was able to pick out central concepts, and he used concept maps to design appropriately focused Chemistry units. In interviews, he described articulately his understandings and use of conceptual change ideas, his valuing of the unit planning process, and his emphasis on modeling, coaching, and fading (Collins, et. al., in press). However, his actual teaching was traditional, and he did not initiate as much analysis and puzzlement (either in interviews or seminars) about his students' thinking or about his own teaching as we observed in other students. The problems he gave students to do were typically not the kind that caused genuine discrepant events or required students to struggle to put ideas together and generate explanations. Instead, his "problems" were typical textbook-type problems, and his way of responding to student difficulties with these was to clarify or remind students of procedures and steps for solving certain types of problems rather than to probe their reasoning and challenge their understanding of the procedures. He also did not consistently make efforts to apply the Chemistry content to everyday situations and phenomena in the students' realm of experience. We have identified three aspects of his experience that might explain his failure to explore conceptual change ideas in deeper ways. First, the nature of Chemistry and the traditional high school Chemistry curriculum presents more difficult challenges to those teachers who want to take a conceptual change approach. Second, Tom was tutoring and taking a Chemistry course during the student teaching term, leaving precious little time for thoughtful evaluation of students' learning. Third, Tom entered the program with the conception that his extensive tutoring and teaching of computer programming had already provided him with much of the knowledge he needed for teaching.

Mike, a secondary history major, was also hampered by an entering conception that he had little to learn from study of teaching and learning. He lacked a deep commitment to a teaching career, sometimes appearing more interested in coaching football than teaching history. A capable and thoughtful history student, he rarely engaged ideas explored in Academic Learning courses as being significant and worthy of his time and effort. He did not keep up with the readings and journal writing, turned in assignments late, and generally tried to get by as easily as possible. Although his interviews and unit planning efforts reveal rather superficial understandings of the theoretical and research base of the program, he described conceptual change ideas as common sense notions that he already knew prior to entering the program. Program experiences were not successful in challenging this view until he was required to repeat student teaching. Then Mike began to engage important issues of teaching and learning. Once he engaged these issues, he was able to plan and teach meaningful, substantive units.

Dana, a secondary math major with 4.0's in her math courses, was the only case study student whose student teaching failed to show any significant evidence of a conceptual orientation. Dana still valued and espoused a conceptual change approach to teaching, but her planning, teaching, and analysis of her teaching showed no glimmers of movement from her entering executive-style, didactic view of mathematics teaching. Despite critical experiences in the program that challenged this view, these experiences and the support she received were not sufficient to change her view of mathematics and the math curriculum as a set of rules, or steps, to follow. Trapped by her inability to view mathematics conceptually, Dana was unable to use program ideas in her teaching.

These cases of less successful students force us to reevaluate ways in which the program could better meet students' needs in learning to teach. The case of Sarah, who spent most of her energies during student teaching trying to solve difficult student discipline problems, has challenged us to consider whether the framework we help students develop for planning and teaching adequately addresses the social context of the classroom. Are there ways we can weave issues dealing with social context into the set of program themes in a meaningful way? Or should we remove student teachers from such challenging classroom contexts? Should we do both?

Dana, whose entrenched view of mathematics as a set of explicit rules and procedures prevented her from building meaningful understandings of program themes, has challenged us to think further about ways in which students can be helped to understand the subject matter themes of the program. As one step in this effort, we are currently piloting and evaluating the impact of a new mathematics course sequence designed to help prospective elementary teachers in the Class of 89 cohort develop meaningful understandings of basic math concepts. In conjunction with this sequence, students will also develop two math units during their math methods course the term prior to student teaching. These units will then be taught during student teaching under the supervision of a mathematics educator as well as the mentor teacher.

Conclusions

Detailed tracing of 11 Academic Learning Program students' experiences from the beginning of their professional teacher preparation through student teaching provides examples of successes, partial successes, and failures in program efforts to help prospective teachers use a conceptual change framework to guide their planning and teaching during student teaching. Because the literature has consistently documented the failure of student teachers to get beyond utilitarian, day-to-day planning and teaching, we are particularly intrigued by the five students in this sample who not only valued conceptual change approaches to teaching but also used this perspective in exemplary ways to guide their actions during student teaching. In particular, these students were successful in developing long-term plans and in fitting daily lessons into these unit plans. Such long-term planning enabled these student teachers to focus on student learning and to integrate across subject matters and across units within a given subject area.

Analysis of these cases focused on identifying what it took for the program to have such an impact on prospective teachers' planning and teaching. The following program features were critical to these students' development and conceptual change:

1. Student understanding and valuing of program goals and conceptual change perspectives were developed gradually over time and in the context of a unit planning process that encouraged students to link knowledge gained from classroom experiences with knowledge gained from Academic Learning courses. This unit planning process was integrated into the program as a critical set of experiences that started early, continued through student teaching, and was

structured in ways that helped students use theoretical ideas emphasized in courses to interpret and manage practical classroom issues.

2. Students' efforts to use a conceptual change framework to plan and teach conceptually-focused units were carefully scaffolded in each of the methods classes and during student teaching by the structure of unit planning requirements, by faculty/student teaching supervisor involvement in the unit planning process, and by mentor oversight of daily planning within the context of the overall unit plan.

3. Mentor teachers for these exemplary students had gained important knowledge of program goals and the unit planning process that enabled them to play an active role in encouraging and supporting students' efforts to develop and teach conceptually-focused units. They also played an active role in helping students consider practical, classroom management issues within the context of unit plan development and teaching. Finally, they provided a setting in which there was some curriculum flexibility and opportunity for students to try alternative teaching approaches.

The cases of students who were less successful in using conceptual change approaches in their teaching also provide important insights about the learning-to-teach process. Two issues growing out of our analyses of these cases are currently being more closely examined in ongoing development of the Academic Learning Program. First, we are considering ways that we can integrate issues about the social context of the classroom (including classroom management issues), into a conceptual change framework for planning and teaching. Second, we are continuing to explore ways to provide additional support to help students develop the subject matter knowledge needed to teach with a conceptual orientation (particularly in mathematics).

This study provides important grist for deliberations about reform in teacher education. On the one hand it provides some important evidence that teacher education can change prospective teachers' conceptions of what it means to teach well in ways that have significant impact on their beginning teacher behavior. After the plethora of reports documenting the lack of teacher education impact on student teaching behavior (and our own experiences with such lack of impact), it is exciting to have some success stories and to have the kinds of detailed data that permit us to understand the web of program features that contributed to that success. In particular, our study of students' development over time provides a deeper understanding of the ways in which key program experiences, such as unit planning and teaching, can contribute to prospective teachers' conceptual change. On the other hand, the study emphasizes the challenges ahead of us if we are going to take teacher education reform seriously. This study provides examples of success, but it does not provide an easy formula for successful teacher education. Helping prospective teachers develop meaningful, research-based frameworks for thinking about planning and teaching requires integrated programmatic efforts that allow students to explore concepts over time in both field and study contexts and that scaffold and connect students' journeys between the world of theory/research and the world of classroom practice.

V.

C. THE ROLE OF SUBJECT MATTER KNOWLEDGE IN LEARNING TO TEACH:

PROSPECTIVE TEACHERS' DEVELOPING UNDERSTANDING OF THE ROLE OF SUBJECT MATTER KNOWLEDGE NEEDED IN TEACHING FOR CONCEPTUAL CHANGE

A recurrent theme in recent discussions surrounding reform in teacher education is the need for increased emphasis on teacher candidates' subject matter preparation. In this paper, we argue for the importance of integrating consideration of subject matter issues into all phases of prospective teachers' professional preparation, including their pre-service professional education coursework, field experiences, and student teaching.

These arguments are supported by our experience with and study of the Academic Learning Teacher Education program, in which teaching for conceptual understanding of subject matter is an overarching theme. In this program, subject matter is given a prominent role in the learning-to-teach process, beginning with students' initial courses in learning and curriculum and continuing through methods courses and student teaching. Such integration of subject matter issues in early professional studies enables teacher candidates to make sense of ways in which theories of teaching and learning specifically apply to teaching subject matter content in classrooms, instead of as idealistic goals that must give way to the realities of practice. It also enables students to deepen their understandings of subject matter and to appreciate the kinds of subject matter knowledge they need in order to teach with a conceptual change orientation. In particular, students study the structure and functions of various subject matters and the importance of being able to think flexibly about subject matter in order to represent it to students in a variety of ways. Thus, the program helps students begin to build a rich store of pedagogical content knowledge - subject matter knowledge that is needed for effective teaching.

To illustrate the power of examining theories of teaching and learning in subject-specific contexts, we describe early experiences in the learning-to-teach process for three secondary education students majoring in English, mathematics, and science. These cases illustrate how prospective teachers' consideration and understanding of issues pertaining to teaching and learning in their subject areas were essential to being able to act on and appropriately make use of the theories and research about learning and teaching. As these students examined and explored their own understanding of conceptual change teaching and learning in the context of what it means to bring about meaningful understanding in their own discipline, they met with more and less success in deepening their subject matter knowledge.

The analysis of these cases will focus on how subject matter themes played out for three students in the first two courses in the Academic Learning Teacher Education Program: educational psychology and philosophy (first year, fall term), and a curriculum course (first year, winter term). Ways in which these early understandings were or were not further developed and evidenced during methods courses (first year, spring term) and student teaching (second year, fall term) will illustrate how, beginning with their earliest professional study, students can benefit by grounding their learning in specific subject matter issues in order to go beyond mere comprehension of their studies and how students can continue to develop their subject matter knowledge as they act on their learnings in practice.

Subject Matter Focus of the Learning and Curriculum Courses

Both the structure and the content of the learning and curriculum foundations courses fostered consideration and analysis of subject matter issues. Structurally, a subject matter focus was facilitated by team teaching of the courses. Each course had 4 instructors, with each instructor responsible for a particular subject matter discussion group (math, English, social studies, or science). The total cohort of 65 students (both elementary and secondary majors) attended lectures addressing learning and curriculum issues across subject areas. However, a significant amount of class time was spent in subject matter-focused discussion groups exploring the implications of theories of learning and conceptual change research in teaching specific subject matter. Each course had general readings for all students as well as subject matter-specific readings.

The content of the two foundations courses addressed understanding of subject matter in four broad areas. The first area of subject matter knowledge fostered in the program is understanding of the structure of knowledge in the disciplines. Understanding the structure of knowledge includes understanding relationships among concepts and skills within a discipline, and seeking ways to help students make and understand connections among central concepts and skills. A second area is understanding of the functions of knowledge in the disciplines, which includes knowing how to help K-12 pupils see and make connections between concepts and skills learned in school and their use and application in the real world. A third key area of subject matter knowledge to be developed is knowledge of student development, or knowledge of how K-12 pupils develop conceptual understanding of school subjects. This entails understanding of the kinds of prior knowledge students of a particular age are likely to bring to a learning situation, how they are likely to interpret new knowledge, and ways to facilitate the process of conceptual change in students. (See Anderson [1987] for a more detailed discussion of the three areas of knowledge.) A fourth kind of knowledge of subject matter we foster throughout the program is pedagogical content knowledge, or knowledge of a variety of ways to represent subject matter to students to bring about conceptual understanding (Wilson and Shulman, 1987). Having this kind of knowledge entails being able to transform disciplinary knowledge and understanding in a teaching situation to make it comprehensible to students.

Understanding of subject matter in these four broad areas was woven throughout Academic Learning Program professional studies, giving students the opportunity to revisit issues and struggle with them over time. Key subject matter issues were integrated into the learning and curriculum courses in two ways: through course content (e.g., course readings, lectures and discussions), and through course experiences (e.g., journal writing, assignments, field visits, and discussions with a mentor teacher).

Developing Multiple Interpretive Lenses

A unifying focus for understanding the role of subject matter in a teaching and learning situation is to think of the relationship among three participants in schools: the teacher, the learner, and the subject matter to be learned (Sizer, 1984; Bernstein, 1975). In the first year of coursework in the Academic Learning Teacher Education Program, this pedagogical relationship is explored by highlighting the role of one aspect in light of implications for the other two. Thus, while students learn to use the interpretive lens of making sense of the learning process to understand how individuals construct understanding of subject matter in their educational psychology course, they do so in light of how the teacher facilitates understanding of particular subject matter in a classroom. This subject matter focus brings learning theories to life by providing a particular instance of learning for analysis. Likewise, while students learn to use the interpretive lens of analyzing _subject matter_ (understanding their discipline and school curriculum) to examine what is taught in schools, they do so in light of how characteristics of the learner and ways in which the teacher makes subject matter comprehensible shape what gets taught and learned. Finally, as students think about ways to _teach_, they must consider the nature of the subject matter to be taught, and ways in which learners will interpret the subject matter as well. As shown in Figure 1, courses in the program single out particular areas to highlight, but help students understand each area as it relates to or interacts with the other two.

Thus, across the first year in the program, students gradually develop their understanding of subject matter in the four broad areas (knowledge of the structure and functions of knowledge in the disciplines, pedagogical content knowledge, and knowledge of student development) by considering the interconnections among various aspects of the pedagogical relationship. In this way, the _content_ of the courses is tightly coordinated across the year.

Table 4 summarizes ways in which issues associated with the three aspects of the pedagogical relationship are explored through course content and field experiences across the first year in the program. For each course, there is a particular interpretive lens the students use to explore the interconnections among teaching, learning, and subject matter. For example in TE 200C, Learning of School Subjects, the main focus of the course is on learning. However, issues about the learning process are made vivid and concrete by considering them in two ways: first in light of issues central to the subject matter area (column A); and second, in light of how they play out in a classroom context (columns B and C). Sets of issues associated with each aspect of the pedagogical relationship that are studied both in class and as they played out in a classroom context are starred.

In TE 205C, Curriculum for Academic Learning, students work on developing and using all three interpretive lenses through analysis of intended (planned), enacted (taught) and actual (learned) curriculum in their mentor teacher's classroom (Columns A, B, C). They explore subject matter issues such as how knowledge in school curricula is structured, and what the functions of school subject matter knowledge ought to be (Column A). Subject matter is analyzed in relationship to how it is best represented to help students understand it (Column B) and how students come to interpret and understand the representation (Column C). Later, in the methods courses, students shift from using the interpretive lenses for the purpose of analysis, to acting on the knowledge they have been developing.

Thus, the various aspects of the pedagogical relationship are interwoven throughout the first year, with the first two courses focusing on teaching the students how to use various interpretive lenses to understand key interconnections among subject matter, teaching, and learning. These interpretive lenses are grounded in principles of teaching and learning that arise out of current research on teaching, and students confront the implications of this research in subject matter specific contexts. We turn now to describing ways in which three students in the program made sense of these experiences, and ways in which their knowledge of subject matter developed over time.

The three cases illustrate these students' developing understanding of subject matter (English, mathematics, science), and enable us to contrast the significance of particular understandings for each student in the learning-to-teach process. We show how two students were more successful than a third student in developing the necessary subject matter understanding needed for teaching for conceptual understanding. We also highlight differences in the nature of the three teacher candidates' understandings, and differences in influences on their development over time.

Learning to Teach English: Karen

Karen is a secondary English major whose story illustrates how program experiences helped change her views of the structure and functions of her discipline. Important influences on her knowledge growth included: a) the emphasis on analyzing the structure and functions of the disciplines in the learning and curriculum courses concurrently with visits to her mentor's classroom, b) the nature of the school curriculum which she analyzed for assignments in these two courses, c) the support of her mentor teacher throughout the program, and d) the support of her student teaching supervisor during student teaching.

In her first interview (at the start of her studies in the program) Karen drew from her experiences as a student to describe the discipline of English:

> English and writing came relatively easy. I could understand the subject, it made sense. I enjoyed learning about grammatical devices and used them to improve my writing skills. In high school, especially senior English, the literature became much more difficult. We started to read Shakespeare, then to analyze poetry. It was a struggle, but I put the time into it, read and reread until some of it sank in. It came with practice. Translating Shakespeare line by line wasn't easy at

> first, but I kept working at it. When I was finally able to decipher an entire passage by myself and really understand what it meant, the satisfaction was tremendous.

Thus, for Karen, learning English consisted of learning writing and interpretive skills, and it meant that hard work and practice paid off in the end. She did not elaborate on the functions or purposes of learning writing and interpretive skills beyond personally enjoying them. She also had a limited view of the structure of knowledge in this discipline. English to Karen was memorizing poetry, learning grammar rules, writing essays, and translating literature so that it could be comprehended. Each of these pieces of English was described as a discrete chunk that stood on its own as curriculum to be mastered. Connections among these pieces were notably lacking.

As Karen continued her study of approaches to teaching and theories of learning in the first course in the program, and as she began to visit her mentor teacher's classroom and use the interpretive lenses she was learning about to analyze teaching and learning in action, her image of the ideal English teacher began to change. After reading and discussing three approaches to teaching (Fenstermacher and Soltis, 1986), Karen was attracted to the liberationist approach because of its emphasis on exploration of ideas and understanding of the subject matter. She began to question whether her high school teacher's methods had actually been that effective with her, or if she just did well because she was naturally good in English. She speculated about whether other students in the class had been so easily satisfied with the hard work involved in memorizing poems or translating Shakespeare line by line. She wondered about the potential of discussing the general themes in a play like Hamlet and helping adolescents explore themes such as the struggle for power.

instead of working toward precise translations. She summarized, "The thinking stuff now comes back to me, and it's a little bit different than what I thought." She began to change her view of the structure of the discipline and saw learning English as more than acquiring writing and interpretive skills. In addition, she began to think about the functions of her discipline, or about additional ways in which students would use what they learn beyond personal enjoyment. Rethinking her view of her discipline caused her to re-evaluate her original opinion of her high school teacher's approach to teaching and the ways in which other learners come to understand English.

During the curriculum course Karen began to think in more specific terms about what she earlier meant by "the thinking stuff" she wanted to emphasize in her teaching, and her visits to her mentor teacher's classroom helped her develop and elaborate these ideals in terms of what can occur in a school setting. Exploration of the connections between reading and writing were discussed in the curriculum course, and she had the opportunity to see and make sense of those connections in teaching practice. Her view of the structure and functions of English continued to change:

> My response has changed since I answered the question before. These TE classes, along with some of my English classes, have really made me aware of the value of thinking. I don't just mean I'm able to think better now, but I guess I look at teaching in more theoretical terms now. Instead of having a "rigid" curriculum and teach facts, I think a more flexible, open curriculum would be more beneficial.

She went on to elaborate how she would establish reading and writing connections, and how she now believed that providing for such connections would facilitate students expressing their reactions to literature and help them develop an appreciation of it.

By her third interview (at the end of the second course), Karen's opinion of her high school teacher had changed even further. She now saw problems with how her former teacher's curriculum was structured: real structured, right from the book, isolated treatment of literature, no choice, no freedom. Thus, in tandem with her changing view of how the curriculum should be structured so that reading and writing are complementary and reciprocal processes, she also changed her view of the learning process. Learning English was not simply dutifully following the teacher's directions but instead required much more active involvement of the learners.

By the end of her first two courses in the program, Karen had tried out several interpretive lenses in analyzing the teaching and learning process. As she tried them out in a subject-specific context, she deepened her understanding of what she meant by "thinking stuff" and what it means to get students actively involved in learning about literature. She reorganized and restructured her views of reading and writing, drawing from case studies in course readings and what she saw in her mentor's classroom to make personal meaning of what a liberationist approach to teaching might look like and what it means when educational psychologists say that students actively construct meaning. Moreover, she worked at restructuring and integrating the isolated topics she learned about from her own high school curriculum so that she more deeply understood ways in which the interpretive process in literature can be facilitated through written response.

Karen's planning and teaching during spring methods courses and her fall student teaching also revealed her growing knowledge of her subject matter in the four broad areas emphasized in the Academic Learning Program. She succeeded in integrating what she understood about the structure and function of her discipline to make pedagogical decisions. In her pre-student teaching unit teaching experience, for example, she took the topic she had been assigned by her mentor (compare/contrast essays, a required piece of the district's curriculum) and integrated it with students' reading of literature. Writing compare and contrast essays was not treated as an isolated skill or event. Instead, Karen helped students use these essays as a tool for interpreting and responding to the short stories they were reading. This approach to teaching was a dramatic shift from her original image of the ideal teacher's curricular organization.

During student teaching, Karen was successful in using this new framework for thinking about English and the English curriculum to plan and teach in ways that went beyond her own experiences with memorizing poetry and translating literature line by line. She struggled, however, when she had to take over her mentor's geography classes. Until this point, because she was an Enlgish major, Karen had focused solely on observing and teaching her mentor's English classes, and did not attempt to study the geography classes. Thus, she had not had an opportunity to explore subject matter issues in this area. However, her student teaching supervisor helped her use the structure/functions framework to organize a conceptually-focused unit on the geography of the Soviet Union. Karen struggled to bring this unit alive. Because her knowledge was not as deep in this area and because it was much more difficult for her to translate what knowledge she did have into appropriate representations for her students, her efforts to use this unit plan were awkward, stilted, and frustrating to Karen. Midway through the unit, however, the student teaching supervisor observed a marked difference in Karen's sense of confidence, her enjoyment in teaching, and her general rapport with the students. When the field instructor asked Karen about this transformation, Karen readily responded, "I see the connections myself." She went on to explain that the more she learned about the topic herself, and the more she settled on and developed overall themes and a direction for her unit, the better she felt about it. Karen acknowledged that she was "meaner" during the first weeks of her unit when she was more concerned with getting through the lesson than about what the students were understanding. Now she was concerned about whether they saw the connections she saw. Karen's mentor also noted that this new understanding of the structure and functions of the content enabled her to field student questions better. Her field instructor noted instances throughout her subsequent teaching where Karen was able to point out to students how each day's lesson connected with previous lessons, and what the major themes or "big ideas" were that she wanted students to comprehend.

The struggle Karen experienced in teaching geography is typical of novices trying to plan in subject areas where they lack understanding of the structure and functions of the knowledge they are to teach. Karen's initial approach was to survive and get through the content. But instead of being satisfied with that approach, she continued to work on her own understanding of the content to the point where she was able to integrate what she knew about pedagogy, about the structure and functions of the content, and about what the students knew and understood about it. By applying the structure/functions/student development framework that she had explored in English for three terms to her study and planning in geography, Karen was able to replace content coverage during the first two weeks of the unit with teaching for conceptual understanding during the remainder of the unit.

This gradual development of knowledge was supported by her mentor teacher and university supervisor, who encouraged Karen and provided concrete suggestions as to how to change the direction of the unit. They helped her revisit ideas about analyzing curriculum from structure, function, and student development perspectives that she had studied in relationship to English. Thus, the seeds for Karen's success with the geography unit were planted during her first foundations courses. However, support from the student teaching supervisor was critical in enabling Karen to transplant those seeds to a new subject area and to use that framework to begin to build pedagogical content knowledge in a new subject area. The geography unit became a critical experience during Karen's student teaching because it developed, rather than "washed out", her maturing understanding of the kinds of knowledge needed to teach for conceptual understanding and because it helped her value in new ways the importance of analyzing subject matter for teaching from the four perspectives emphasized initially in her foundations courses.

Learning to Teach Mathematics: Dana

Dana entered the Academic Learning Program with the highest grade point in mathematics courses of any of the students in the Class of 88 cohort. In her mathematics courses, she had a straight 4.0 and an overall GPA above 3.5. That track record might suggest that Dana already had the subject matter knowledge needed to teach mathematics. However, Dana's story is not a success story. In this case we illustrate how Dana's algorithmic, rule-based view of the structure of mathematics and her limited understandings of the usefulness of mathematical concepts did not change sufficiently to impact on her student teaching experience.

In Dana's first interview her narrow view of the nature of mathematics and how people learn mathematics was strikingly apparent. Dana liked math because it was neat, orderly, and if you followed the rules carefully you would get the right answers. She enjoyed school math because she was good at it, not because it enabled her to see the world in new ways or because she enjoyed struggling with difficult puzzles and problems or because of its importance in various aspects of everyday life.

> I've always enjoyed math because I found it challenging, logical, and most importantly, I did well in it...I can easily choose math as a class in which the learning comes naturally.

Dana's view of learning mathematics focused on hard work and determination in finding the right form or algorithm to fit the situation and to perform the computations carefully to find the answer. This fits with her rule-based view of mathematics. She explained in her entry interview:

> I: What would you like your students to understand about mathematics that would make them educated people in math?
>
> D: ...I also think math is something that anyone can do if they try. I'll always believe that and it really makes me mad when people say they can't do it, because I've always worked at it and I can do it. Right when you start off with math, if you can always keep up with it and do it, I think everybody can do it that way. I'd like to stress that, if they keep up with it and they do it and they work at it, and get help if they need it...
>
> Most any problem that they have, in algebra (for example), there's always some kind of form that you can follow, if they can just find that out, even for a story problem. I do not like story problems, but some of them like in algebra...There are basic ways that you can just follow through, like let X equal this...If they can see that there's a way to do all of them somehow. Also get the attitude that if they're in a book or something or if they're there, they've got to be able to be learned. They can't be that hard for them, if they work at it. (Emphasis added.)

Her ideal teacher was organized and made the rules and procedures of mathematics clear and easy to follow. Dana complained about story problems, grudgingly admitting that they were probably important but that they were always difficult for her. Dana did not talk about the importance of mathematics for solving real life problems; her view of math was strictly limited to the school curriculum she had experienced.

The first two courses in the Academic Learning program challenged this view of mathematics. In the learning course, the structure of mathematics was analyzed and related to three approaches to teaching described in the Fenstermacher and Soltis (1986) text - the executive, the therapist, and the liberationist. Dana found the liberationist appealing but not appropriate for mathematics teaching:

> D: Well, in a way, the 3 approaches to teaching; the executive, the therapist and the liberalist (sic), those are something to think about, the way you go about that. Basically, I agree more with the executive in a way. There are some other things that, I can remember them saying a lot, but it's more for elementary classrooms in a way, letting the kids explore on their own...In secondary, like teaching math, I don't see how you could do something like that, in a way. I think the executive is what you'd have to use because you have to kind of just give information. Sure, I'm willing to help out, you know, give those students extra time, as much as they want, but as far as the classroom time...
>
> I: So describe for me a little bit, how you characterize the executive approach to teaching.
>
> D: They would read the book, you know, plan out how they're going to do their lesson, and then just follow that approach. You use mostly the book and stuff, you know, bring other stuff, you have other examples to show, and then give tests, and grade on that. Answer questions if they have them. You don't have to go strictly by what you plan if the students have more questions and you're willing, then that's fine.

In the curriculum course, Dana's instructors continued to challenge this view of mathematics and the mathematics curriculum. Through readings and class discussion, they provided alternative ways of thinking about the structure and functions of mathematics. Dana read a case study of a teacher who shifted from a procedural approach to teaching math to a conceptually-focused approach (Madsen-Nason & Lanier, 1986). This appealed to Dana, and she recognized that her own view of the ideal math teacher was quite limited. But it was difficult for Dana to use this conceptual orientation in analyzing her mentor's teaching and curriculum. In an assignment in which she was to focus on alternative representations used by the mentor teacher, Dana wrote in her paper:

> Wilson and Shulman discuss how teachers use different representations to explain their subjects. In some subjects, though, it is harder to come up with different representations than others. Mathematics, for instance. Some things in mathematics can only be explained in one way.

While Dana's mentor was impressed with her academic success in math, Dana's instructor in the curriculum course was frustrated with her superficial understandings of mathematics. He recognized that while Dana could use the language of conceptual change, her understandings of it were not deep because she could not shift her understandings of mathematics itself. He pushed her hard to reconsider her statement that "some things in mathematics can only be explained one way." While other students in the class were experiencing important insights and were able to translate these insights into their analyses of typical mathematics instruction (in their own high school and college math courses as well as in their mentors' classrooms), Dana kept trying instead to figure out what her instructor wanted. She was not used to getting low grades, and she worked hard to rewrite papers and to meet individually with the instructor in order to raise her grades. In the interview at the end of the curriculum course, she reflected on the struggle she had had in getting through that course. In the process of the interview, she seemed to be putting together some of the ideas and recognizing how difficult it was going to be for her to become a conceptual change teacher. She valued this image of the ideal teacher but doubted that she could achieve it.

Unfortunately, her unit teaching experience spring term did not succeed in building on the very tentative and fragile growth she had experienced during the curriculum course. What Dana needed at this point was concentrated support in developing a conceptually-focused unit and in analyzing how the unit could be taught in a conceptual vs. a procedural way. Instead, Dana received advice on her unit from a variety of people - her mentor teacher (whose own ideas of conceptual change teaching were just beginning to develop), her methods instructor who was unaware that this was a student who needed extra support, her content area reading instructor who recognized Dana's needs and pushed her to think about structure, functions, and student development but who did not have the mathematics background to figure out how to teach about matrices and determinants with a conceptual orientation. Dana, on her own with just bits and pieces of advice, was unable to figure out a conceptual approach to this unit. Perhaps if she had been assigned to teach about fractions in a middle school setting like some of her classmates, she might have been able to plan and teach with a conceptual orientation and to begin to learn that there are alternatives to algorithmic, rule-based approaches to teaching math.

Instead, Dana's unit teaching and her subsequent student teaching were primarily imitations of the kinds of teaching she had experienced herself and that her mentor teacher also was most familiar and comfortable with. Although she could give lip service to the importance of concepts, they were seldom used as tools during her practice teaching. Instead, she relied heavily on memory as the intellectual tool that gets one through mathematics, and she communicated this to her students. On one of her tests a third of the class incorrectly solved x^4 x^3 as equal to x^{12}. Dana chastised students for being careless and not remembering that you add rather than multiply exponents. A conceptually-oriented response could have been, "What does x^4 mean?", to which students would have readily replied "x as a factor 4 times" and then realized that "x was a factor 7 times". In Dana's executive approach to teaching, students watched, listened, responded, and did assignments - the proxy for learning - and were encouraged to "remember".

Dana's student teaching supervisor pushed her to think about what sense students were making of her rule-based approach and of her frequent admonitions to them to be careful and to stop making careless mistakes. How did she know they were careless mistakes versus conceptual misunderstandings? Dana became tense about these challenges, and she worked hard to develop one unit that incorporated a more conceptual orientation, using algebra tiles to represent multiplication and factoring of polynomials. However, Dana saw this unit as a requirement completed to pass student teaching and to get a reasonable recommendation from her supervisor, not as an opportunity to explore the problems with her patterns of instruction.

Dana sensed that she was not meeting program goals, but both she and her mentor teacher were satisfied with her accomplishments. Dana pointed to her strengths: she was a hard worker, she was willing to meet with students after school to help them, she was organized and presented things succinctly, and she was patient. She recognized that she was unable to anticipate in her planning the kinds of questions students would ask or the kinds of things that would be difficult for them. But, instead of recognizing this as an important problem in the depth of her subject matter understanding, she reassured herself that she would quickly learn about students' problems and difficulties as they raised them in class. Experience would be her teacher. She felt confident that she could address students' questions as they came up; however, analysis of her responses to students during student teaching shows the same old pattern of telling students the rules, reminding them of the steps. Dana did not help them understand why those steps made sense or encourage them to explore other ways of making sense of problems. And although Dana remained least confident about her ability to understand the functions of the algebra she was teaching, she did not struggle to help students understand how this knowledge was useful. When story problems came up in the text, Dana approached them apprehensively, carefully working out the solutions to each in detail ahead of time. Being sure she had the correct solution was the primary focus of her planning for lessons that included story problems. She had students complete the story problems given in the textbook, but did not extend these or generate additional examples.

Dana completed student teaching without making a significant shift in her understanding of how the school mathematics curriculum could foster conceptual understanding instead of its typical focus on memorization of rules and procedures. Dana graduated in Spring, 1988, with 4.0's in all but one of her mathematics courses. Her success in using an algorithmic approach to mathematics study was clearly one factor that made conceptual change so difficult for her. In addition, her ingrained way of thinking about mathematics was not challenged by her mentor teacher's practice or thinking. The curriculum in her mentors' classroom - high school Algebra II - did not provide an accessible context in which Dana could easily explore mathematics in a conceptual way. Finally, the support she received from various university faculty was only successful in raising doubts in her mind that could be smoothed over by getting through her lessons. This support was not enough to enable her to recognize that she needed to work hard to change her understandings of mathematics so that her lessons could improve.

In retrospect it appears that the conception of mathematics, including the teaching and learning of mathematics, that Dana brought with her to professional education studies and upper division studies in mathematics was the single most influential variable in her learning to teach. Although the education studies and some of her mathematics courses took her on trips away from this beginning conception, she has steadfastly returned from each journey with the original conception relatively unchanged.

Learning to Teach Science: Dave

In contrast with Karen and Dana, Dave began the teacher education program with a fairly rich sense of the structure and functions of his discipline. Although it was clear that he sometimes made it through tough biology courses by memorizing a lot of information without fitting it all into some conceptual framework, Dave valued and strove for conceptual understanding of his subject and saw biological knowledge (both his own personal knowledge and knowledge within the discipline) as constantly changing and growing. He reflected an understanding and valuing of science and biology that went beyond a simplistic view of science as an orderly set of facts and a prescribed, algorithmic scientific method:

> D: I just thoroughly enjoy understanding it, and understanding what's going on. Things I've always wondered about. It breeds more wonder. The more you learn, the more you want to learn. I should go back to grad school I guess....I feel really strong in my conceptual knowledge and I guess that's about it. That I would be able to explain most concepts, you know, after reviewing them and going over the terms that I have to know.

Dave's understanding of the conceptual structure of biology was integrated with his understanding of the functions of biological knowledge. In his entry interview, for example, he talked about biology as being "the ideal thing to teach because it's so related to kids' everyday world and so related to things they might wonder about".

Thus, Dave began his teacher education study already holding a reasonably coherent and rich structural understanding of his subject matter. He also saw biological knowledge as having a variety of important functions, including the power to explain many aspects of everyday life as well as to enable a deeper appreciation of the beauty, complexities, and wonders of the natural world. Dave was clearly confident that he knew his subject well enough to teach it to the middle school students in his mentor teacher's classroom. During his first visit to the classroom, this confidence was reinforced and his attention was quickly drawn to other issues.

Early influences on Dave's changing views. Throughout his first-term teacher education experiences in the learning course and the classroom field assignments associated with it, Dave's attention was focused on issues other than subject matter. The discussions in the course about the nature of knowledge and knowledge growth in the disciplines were not the issues Dave raised in his journal writing, in his written analyses of his field assignments, or in the interviews. Instead, he thought a great deal about the three different approaches to teaching - the executive, the therapist, and the liberationist - being discussed in the course (Fenstermacher & Soltis, 1986). He used this framework to analyze his mentor teacher's practice and to help him confirm his personal decision to go into teaching instead of medicine. While the course highlighted learning as the primary interpretive lens for understanding teaching and subject matter, Dave used a teaching lens to look at the course readings and his mentor's classroom. For example, he was interested in student behavior and how the teacher responded to disruptions. Why didn't the teacher stop the kids in the back of the room from passing notes? But he attended very little to the subject matter being taught except to comment on how reassuring it was to realize that this was content he felt comfortable with and prepared to teach.

However, subject matter did not long remain in the background for Dave. In the curriculum course in the second term of the program, Dave's subject matter confidence was shaken as he came up against the difficulties of translating subject matter understandings into knowledge for teaching. During this course Dave began a struggle that continued through his student teaching and that he has defined as a long-term goal for himself as a teacher. The struggle centered on the development of what Wilson and Shulman (1987) and others call pedagogical content knowledge. The structure of the curriculum course and its associated field assignments stimulated Dave to develop a new appreciation for the kinds of subject matter knowledge he needed in order to transform his own understandings into representations that would help his students develop conceptual understandings of biology.

The issue of transforming subject matter knowledge for teaching, or pedagogical content knowledge, was the primary interpretive lens that Steve used in his visits to his mentor's classroom during the curriculum course. Although Dave focused on these subject matter issues and early on acknowledged the difficulty of portraying scientific ideas to students, he remained confident early in the term that he could do this fairly easily. He talked about how he felt confident to explain concepts to students, that it was mostly the specifics and details that he would need to brush up on. Developing appropriate representations was important to him, but he did not view this as particularly difficult to do:

> I: Suppose you're going to teach a unit like this (about food chains), before you consider yourself actually ready to teach them that, what kinds of things would you have...
>
> D: First of all, I'd go through and make sure I know the concept very well, and I'd study all the parts of that, and I'd probably make out a list of exactly all I wanted them to get out of it, and the different representations that I could use. I could think about that a lot, but I think I'm a lot better on the spot. That's the way I've always been, in creating analogies right off the spot depending on the misconceptions of the children. (Emphasis added.)

By the end of the curriculum course, however, Dave had developed a much deeper understanding of the difficulty of translating subject matter knowledge into useful representations. In contrast with his earlier view that he could develop representations "on the spot", Dave had a deeper appreciation of the difficulty of representing subject matter in ways that would connect with students:

> D: What we're talking about this term really shook me up because I am confident in my knowledge, but how to put it across so that the students will understand it? Not just that they'll memorize it...With the many different representations, what's the best way to do it? Because it's so hard when I can sit there and think forever and it just comes to (my mentor teacher)... What we're talking about now is how to put the information to students in a way that they can understand it and comprehend and put a picture in his mind of what you're trying to teach him before he'll understand it. We're discussing the complexities that go into it and the different ways in which it can be done. Things I never thought about...

In analyzing his mentor's intended, enacted, and actual curricula Dave developed critical insights about the kinds of subject matter representations that promote student understanding. He reports being "surprised", "shocked" and "frustrated" to find out that students in his mentor's class were not developing the intended understandings. Dave started to realize that despite his mentor's skill in telling good stories to illustrate concepts, he did not use enough different representations to change students' misconceptions. In his interview Dave talked about ways in which his image of the ideal teacher was now much more "in depth", and that the new pieces in his image had to do with subject matter and connecting subject matter with students' ways of thinking and learning:

> Well, for me, an ideal teacher would be someone who really knew their subject matter and knew how to put it across to their children, who could read their children well, and knew what kinds of questions to ask to check for understanding.
>
> You have to know what you're talking about, you have to have everything clear in your mind to begin with. And it seemed to me you have to know a lot more than just what you're teaching in the subject. You have to know what you're leading up to and hopefully you want your students to understand it at the level that you do so that they can branch off more and, this is later, this is working towards a goal, but so they can branch off and know more complex things. And you have to be able to have a workable knowledge to identify misconceptions. Both in seeing what mistakes you made when learning it and how you solved them and how you, what seemed to be going on with other people. A lot of people misunderstand things. Unless you have that thorough understanding you won't be able to do that.

Dave's learning from practice. Dave's understandings of the kinds of knowledge needed to develop rich pedagogical content knowledge continued to deepen as he began to teach, first during the spring term methods courses and later during student teaching. Dave's journal recounts the struggles he faced in planning and teaching a unit about energy flow in food chains during the spring term methods course. This was a topic he talked about in his earlier interview (see page 103) as one that he would feel very confident teaching. Now, however, he began to realize how difficult it is to come up with good representations. He was particularly impressed with the need to come up with a variety of representations and to surface students' ideas and misconceptions. In his analysis of his unit teaching, he mentioned several times the importance of having examples, stories, and different ways of presenting concepts planned ahead of time:

> Throughout the week all I could think about were different ways of presenting my material so my kids would understand it. Sometimes I succeeded in this task, sometimes I failed.

When asked whether he felt like he needed more knowledge about food chains to teach the unit effectively, Dave's response was not that he needed more knowledge, but rather that he needed different kinds of knowledge: "Examples are really hard to come by and trying to have a storehouse of representations".

In the context of student teaching the following Fall, Dave relearned and extended these lessons. Early in the term, he planned and taught units using an Academic Learning Program planning format that emphasized program themes about the structure and functions of the subject matter and about student development. However, as Dave recounts his experiences, these issues were not prominent in his thinking during the first half of student teaching. Instead, he focused on managing student behavior and maintaining students' interest and attention. However, by the end of the term these issues had been resolved and were of secondary importance to him. The most important learnings for him during student teaching related to pedagogical subject matter knowledge:

> I: Describe the most important things you've learned this term from your student teaching.
>
> D: No matter what you have to have a common thread in what you're doing. Relate everything back to that mainstream of what you're trying to get across to the kids. I can see that everything I do right now I try to tie it in. It won't bug me at all to spend six or seven minutes on one certain thing to tie it all back in to everything we've done so far...Because I'll ask a question, maybe an application question, and I can see where all the loopholes were where I missed. I had an incomplete concept map if you want to describe it that way. You have to be really specific. I learned that you can't assume that the kids know something or that the kids are going to make this connection.

Despite direct efforts by the university student teaching instructor to encourage Dave to make these kinds of links between the subject matter and the students, Dave identified a student comment as having heightened his awareness of these issues. Apparently, this student comment came just at a moment when Dave was ready to set aside management and procedural issues as his primary focus and was ready to reconsider in a new light ideas studied in his first year in the program:

> D: I think right now I'm tying everything back really well. It clicked, one day I remember it clicked. We were doing cell parts and a student, not even I, said "life activities". And that clicked, that I've got to connect everything back. I was teaching each unit separately, and he said, "Well they have to perform the life activities". It just came up in class. So I asked, "Well, what does it mean for a cell to be alive?" And from then on, I don't know what I would have done if that didn't happen...Now I tie everything back.

Thus, Dave became concerned again with issues about the structure of the subject matter and how to best represent that in his teaching. He thought about this issue in new ways during student teaching, extending his ideas about the importance of relating ideas. No longer were these ideas bounded to a given unit as he had done in the spring term teaching assignment. From his teaching practice, Dave learned to extend these notions beyond the unit level in order to connect ideas between units.

In talking about his ideal teacher and ways in which his image of the ideal teacher changed as a result of the student teaching experience, Dave showed a new appreciation of the relationships between teaching, learning, and subject matter. He ended his student teaching experience still struggling with the difficulties raised a year earlier in the curriculum course about representing subject matter in ways that will connect with students and help them through the process of conceptual change. At the end of student teaching, Dave seemed to value the importance of continuing to struggle with these issues, reflecting an appreciation that learning to teach for conceptual change is a complex and ongoing process that requires careful attention to rich subject matter knowledge.

> I: Are there any ways in which the student teaching experience has changed your image of the ideal teacher?
>
> D: ...Subject matter knowledge too, I think that's changed a lot. No matter what, you don't know enough about something to answer every question the way it should be answered. It's hard sometimes. I go, "Well, if you guys knew about this," and I'll try to explain it to them, but there has been a few questions where I feel even though I tried to simplify it, that explanation wasn't good enough. I didn't know enough about something to put it in terms that they would understand. I could explain it to somebody else, another college student, but not to the kids because I didn't understand it enough. Does that make sense?

Discussion and Conclusions

There are several significant contrasts in the nature of the teacher candidates' developing understandings across the cases, and in influences on their learning. Although all three case study students had done well in courses in their respective majors, each student entered the program with a different level of understanding of the structure and functions of knowledge in their disciplines. Dave understood and experienced the value of conceptual understanding in science when he entered the program, and intuitively understood the links he wanted his pupils to make between their school learning and its application to the world around them. In contrast, Karen and Dana's prior knowledge and experience with English and mathematics reflected limited views of their disciplines that required developing new knowledge and understandings of the structure and functions of their disciplines if they were to learn to help their pupils go beyond personal enjoyment at being "good at" their discipline. Thus, the starting points for learning to teach subject matter varied across these cases.

Different features of the teacher education program were salient for different students' knowledge development as well. For example, in contrast to Karen, discussion of subject matter issues was not particularly significant for Dave during the learning course, because his view of his discipline fit with the views discussed in the course. However, when he was confronted with understanding and analyzing various ways to represent subject matter to promote conceptual understanding of scientific concepts early in his professional studies (in the curriculum course), his initial confidence in his subject matter knowledge was shaken. Through his analysis of curriculum in his mentor teachers' classroom, he gradually discovered that although his mentor teacher shared his goals of teaching for conceptual understanding, this teacher did not strive for developing multiple representations of the subject matter to facilitate active student involvement in the learning process. For Dave, developing his own pedagogical content knowledge so that he could go beyond merely explaining concepts was a particular challenge that continued on through his student teaching.

Once Karen had redefined her views of what it means to teach English, and once she could elaborate that view and see ways to connect reading and writing as reciprocal and complementary processes, she had little difficulty developing strategies and representations to help students make such connections in her Language Arts teaching. For Karen, the early focus on approaches to teaching in a subject-specific context helped her rethink her views of the structure and function of knowledge in her discipline. Her pedagogical content knowledge development flowed fairly smoothly and seemed like a natural process for her.

She often commented that she saw the course readings as elaborating the ideal, and her mentor teacher's practices as an example of how the ideal can become a reality. Thus, her field placement and field assignments were a perfect place for her to deepen her understandings of the areas of subject matter knowledge she needed to develop. Yet when she needed to implement her teaching goals in a subject area with which she had not thought out the structure and function (geography), she was initially at a loss to develop teaching strategies. It was only when she used her pedagogical knowledge of English as a framework, coupled with deepening her understanding of the structure and functions of the geography content, that she was able to develop strategies that promoted conceptual understanding of the geography content. This process required a great deal of encouragement and support from both her university supervisor and her mentor teacher, but she came away from the experience with an overall understanding of the importance of examining the structure and functions of subject matter as part of developing planning goals.

Dana maintained her initial views of what it means to understand mathematics throughout her experiences in the program. Since, for her, understanding mathematics continued to mean learning the rules for solving math problems, her teaching strategies during her unit teaching in methods and in her student teaching reflected that view of the structure and function of mathematical knowledge. Her efforts at developing pedagogical content knowledge consisted of constructing more organized ways to explain the steps and rules in working through problems instead of developing multiple ways to represent mathematical concepts to pupils. Despite the strong support she received during the curriculum course in analyzing the structure and function of the mathematics curriculum, she did not let go of her initial view of the discipline, and was therefore unable to make sense of alternative ways to think about teaching goals or about teaching strategies.

A possible explanation for the lack of change in her thinking is the nature of the curriculum in her field placement. The topic of algebra is a particularly difficult one for teacher candidates to work with to understand what conceptual understanding means for pupils. It takes a great deal of rethinking about the nature of algebraic concepts and their relationship to the field of mathematics to get beyond teaching for procedural and computational facility. Moreover, Dana did not have the benefit of seeing her mentor teacher model teaching for conceptual understanding, so her initial views of teaching and understanding mathematics were reinforced in that setting, not challenged.

The development and maturation Karen and Dave experienced would not have been possible without consideration of subject matter issues in their early professional studies. By developing and using the interpretive lenses for making sense of subject matter content, learning processes, and teaching for conceptual understanding of subject matter, these students had the opportunity to repeatedly struggle over time with key issues in their disciplines. They needed these opportunities to revisit and rethink important issues with guidance and support from program faculty and their mentor teachers. Thus, the programmatic nature of the field assignments and content across the early professional studies was central to these students' gradually deepening understanding of knowledge in their disciplines.

These cases suggest that if teacher educators are going to treat seriously subject matter issues in professional studies, these issues need to be integrated throughout all professional studies, including early experiences such as foundations courses. Early studies of schooling, teaching and learning should not be treated as general areas of study, leaving subject matter issues to methods courses or student teaching. Our findings indicate that early and programmatic analysis of links between professional studies and teaching practice in subject-specific contexts has helped many of our students develop knowledge of their disciplines in four critical areas.

V.

D. BECOMING A REFLECTIVE TEACHER OF SUBJECT MATTER:

PROSPECTIVE TEACHERS' DEVELOPING UNDERSTANDING OF REFLECTION IN THE LEARNING-TO-TEACH PROCESS

Introduction: Understanding and Using Reflection in Teacher Education

The term "reflection" comes up repeatedly in the teacher education literature as a way of helping prospective teachers learn to teach. However, its particular meaning and use varies across teacher education programs to such an extent that it has become more of a "slogan" (Liston & Zeichner, 1987) than a well developed concept or tool for learning-to-teach. Moreover, there is a range of views embedded in teacher education programs regarding the role reflection plays in good teaching, or what it means to be a "reflective teacher." Recognizing this lack of integration of the meaning of the term and use of reflection in the learning-to-teach process and in teaching actively, we studied prospective teachers' developing understandings of and use of reflection in the learning-to-teach process in the Academic Learning Teacher Education Program at Michigan State University. Our close study of 12 case study students across a two-year learning-to-teach process enabled us to describe and explain ways in which reflection is a useful tool for helping these novices understand and act on a conceptually coherent view of teaching and learning.

The purpose of this paper is to describe our view of reflection and reflective teaching as it is embedded in the learning-to-teach process over the course of students' two-year undergraduate program, and to illustrate how reflection is used systematically as a tool for helping students develop understanding of specific program themes and concepts. We argue that in order to become reflective teachers who act on their developing professional knowledge base in appropriate ways, teacher candidates need to understand and value ways in which the reflective process is more powerful when it is guided by a professional knowledge base. In addition, students need repeated and varied opportunities to reflect on specific aspects of that knowledge base to develop their capabilities and disposition to reflect.

This description, illustrated with examples from our data, shows how reflection can be more than a mere slogan, and can be used in a conceptually coherent and programmatic way to facilitate the learning-to-teach process. Integration of the process and content of reflection across program experiences provides occasions for students to learn to reflect about classroom life and schooling in meaningful ways and to use the reflective process to solve or manage instructional problems. Learning to reflect is a process of developing conceptual tools for effective teaching.

Reflection as Developing and Using Conceptual Tools

The view of reflective teaching and the role of reflection in the learning-to-teach process embedded in the Academic Learning Program occupies a particular place in the range of views found in the teacher education literature. The concept of reflective teaching developed in the program entails bringing a conceptually coherent professional knowledge base to bear on solving or managing teaching and learning issues. Such a view implies emphasizing particular purposes and processes in reflection, and using a particular knowledge base as part of reflection.

The use of reflection in the Academic Learning Program contrasts with others described in the literature in three major ways: purposes of reflection; the tension between focusing on teaching students to use reflective processes and teaching students a knowledge base to reflect about; and the contexts in which students are to learn to reflect.

The Purpose of Reflective Activity

Liston and Zeichner (1987) outline three levels, or distinct "arenas of analysis and appraisal" for reflective activity, that are described in the literature on reflection. On one level, prospective teachers should reflect about the pedagogical and curricular means used to attain educational aims. Secondly, they should examine and appraise the underlying assumptions and consequences of pedagogical action. Third, they should analyze the moral implications of pedagogical actions and the structure of schooling. One way teacher educators differ is in their views of which of these "arenas" is an appropriate starting point for reflection in the learning-to-teach process.

Some programs focus very specifically on the first level of reflection, helping prospective teachers critically examine concepts related to pedagogy and curriculum as part of their professional coursework (e.g., Clift, 1988; Charvoz, Crow & Knowles, 1988; Shaker & Ulrich, 1988). The assumption is that by fostering critical appraisal of course concepts through reflective activity, prospective teachers will better understand the concepts they will later need in their teaching. In the Academic Learning Program, we found that despite reflective activity that helped students develop clear understandings of concepts learned in courses, the students were still unable to use such concepts to guide their planning and teaching. Using reflection to understand course concepts was not enough to become effective teachers.

Still others incorporate two levels of reflection in the learning-to-teach process by having students examine curriculum and pedagogy as well as examining the consequences of pedagogical action (e.g., LaBoskey, 1988; Zeichner, in press). Thus, an attempt is made to provide a bridge between learning of theory through professional coursework and the realities of classroom life through various types of "field experiences." Reflection about consequences of pedagogical action is often facilitated by using particular strategies such as having students conduct action research, ethnographic studies, and case studies accompanied by discussions, journal writing, and written cases.

These two levels of reflective activity share a common starting point of studying daily classroom practice. The purview of the reflective process is basically limited to the level of trying to understand how theories of teaching and learning are reflected in the realities of classroom life. Some analysis of issues related to school practices also occurs as well, but is not the primary focus. Thus, the starting point for learning to be a "reflective teacher" is learning to analyze carefully pedagogical and curriculum issues, using program or course concepts as conceptual tools for analysis which then guide one's classroom teaching.

Another starting point for using reflective activity in the learning-to-teach process is to consider broader issues of schooling and society. Some teacher education programs are structured to facilitate reflection at the third level, having prospective teachers consider the moral implications of pedagogical actions and the structure of schooling as a major reflective activity (e.g., Liston & Zeichner, 1987). Thus, future teachers are encouraged to confront the moral dilemmas of instruction and conditions of schooling in a deliberate fashion. They are taught to examine ways in which the structure of schooling influences classroom learning (e.g., tracking, ability grouping, curriculum selection practices).

In the Academic Learning Program, reflective activity initially focuses on the first two levels, where students learn to use course concepts to interpret issues of curriculum and pedagogy in classrooms. This starting point for learning to teach focuses on gradually developing a conceptually coherent view of the teaching and learning process over time and being able to act on that view in actual teaching practice. In addition, reflective activity focuses on a particular knowledge base (to be discussed in the following section). Embedded in this view of learning-to-teach are the assumptions that good teaching means helping pupils develop conceptual understanding of worthwhile subject matter content, and that these future teachers can only address broader dilemmas of the structure of schooling if they have the knowledge and skills to be effective teachers. Thus, reflection in this program is used as a tool to help prospective teachers link their developing understandings of research and theory studied in professional education courses with the realities of classroom life, and address issues of teaching and learning at the classroom level. Broader issues that arise are addressed in terms of what is responsible pedagogy and which teaching strategies and classroom organization will bring about conceptual learning.

The context for reflection and analysis is broadened during a social foundations course taken by students after their student teaching term. Thus, the third level or arena for analysis provides an occasion for students to integrate and bring together their knowledge and understandings of the teaching and learning process (theoretical and experienced) in specific classroom situations while grappling with broader questions of equity, worthwhile aims for schooling, and morally appropriate choices for means and ends in carrying out the professional role of teacher (see Zeuli & Buchmann, 1988). This third "arena" is a culminating purpose for reflection in the program, rather than a starting point.

A Balance Between Process and Content

There seems to be a consensus in the literature that reflection in teacher education is a good idea, and that students will come to realize and appreciate the benefits of reflection by experiencing it. Surely, promoting thinking and analysis must be a valuable strategy for helping people learn to teach. Yet many teacher educators point out that the process is used so differently, that it is difficult to know what the benefits of reflection are (Liston & Zeichner, 1987; Calderhead, 1988), or whether prospective teachers understand the role of reflection in the process of learning to teach (Calderhead, 1988).

Academic Learning Program faculty have found that while more general reflective activity (e.g., analysis of concepts through reading, discussion, writing) helps students understand course concepts related to curriculum, pedagogy, and learning, understanding of concepts taught in professional coursework does not necessarily enable students to act on them in their own teaching practice. This view is supported in the literature where it is often argued that the realities of classroom life are so incongruent with theories of teaching and learning taught in professional coursework, that prospective teachers focus on surviving during student teaching, and the effects of their learning are "washed out" in practice (Zeichner, 1980; Erdman, 1983; Tabachnick et al, 1982).

Making sense of theories of teaching and learning as they apply to teaching of specific subject matter content in classrooms, instead of as idealistic goals that must give way to the routines of practice, requires a process of conceptual change (Posner et al., 1982) in teacher candidates. Bringing about conceptual change includes using the reflective process to address three areas: Eliciting prospective teachers' current ideas and beliefs for close examination; challenging ideas and beliefs and closely examining ways in which their beliefs about teaching and learning make sense and fit together; and helping them develop a conceptually coherent view of the learning and teaching process. Reflection plays a central role in facilitating this gradual process of conceptual change. In addition, faculty encourage and provide occasions for students to reflect on their own learning process, as students of subject matter and as students of teaching, to help them develop the disposition to use reflection as a means to understand the learning process and make instructional decisions.

A particular kind of reflective activity is required if students of teaching are to go beyond mere comprehension of concepts to being able to act on them in their practice. Instead of only using reflection as a tool within specific courses (e.g., a learning course or a curriculum course), reflection is used as a tool within and across courses and field experiences in a programmatic way, and consistently draws on a particular knowledge base. This enables program faculty to provide repeated occasions in multiple contexts for students to reflect on the same issues, but in increasingly comprehensive and complex ways over time. Occasions to confront issues about ways to structure and effectively represent subject matter content geared toward developmental needs of children in an environment conducive to conceptual learning are woven throughout the two years of coursework and field work.

The knowledge base in the Academic Learning Program is designed to provide a conceptually coherent view of teaching and learning based on current classroom research. Instead of asking students to consider a little bit about a multitude of competing views, program faculty ask them to carefully consider curriculum and learning issues that head toward a well developed and integrated view of how one can teach for conceptual understanding in the classroom. It is a difficult and protracted struggle to understand and develop a meaningful conception of the interrelationship between and among three participants in schools: the teacher, the learner, and the subject matter to be learned (Sizer, 1984; Bernstein, 1975). Thus, the faculty structure course and field experiences that require students to carefully analyze a set of theories supported by research that provide an integrated, conceptually coherent view of teaching and learning.

Analytic activity surrounds exploration of four curriculum themes in the program: (a) helping prospective teachers adopt a constructivist view of learners who develop their own understanding of subject matter knowledge, and whose prior knowledge and experience influence their interpretations of instruction (Magoon, 1977; Davis, 1981; Rosner et al., 1982); (b) helping students develop knowledge of effective strategies and appropriate learning environments for conceptual change teaching that will promote conceptual understanding; (c) helping students develop an understanding of the need for rich subject matter knowledge (Bruner 1960/1982; Schwab, 1978), including knowledge of the structures of the disciplines, the functions of knowledge in subject areas, and the nature of inquiry and knowledge growth in the disciplines; and (d) helping teacher candidates understand learning-to-teach as an ongoing process that requires continued study and reflections on teaching experience (Feiman-Nemser, 1983; Schan, 1983).

The conceptual change process is studied by teacher candidates to help them understand ways in which learners construct understanding of subject matter knowledge. This research also suggests specific improvements in teaching practice that can promote student learning (Palinscar & Brown, 1984; Minstrell, 1984; Roth, 1984; Madsen-Nason & Lanier, 1986; Anderson & Roth, in press; Roth, Anderson, & Smith, 1987). Thus, this knowledge base on the learning process, disciplinary knowledge, pedagogical knowledge, and the role of the reflective process in improving teaching practice is particularly powerful in helping teacher candidates learn to teach effectively.

By providing occasions for teacher candidates to examine and analyze this set of theories in light of their own prior knowledge and understanding of teaching and learning, and by examining them in light of how they help students interpret classroom life, faculty and mentor teachers promote lively discussions regarding the merits of the theories as useful tools for solving and managing instructional issues. Students repeatedly have the opportunity to examine their own beliefs and assumptions and weigh them against research-based views of teaching and learning, and against the realities of particular teaching situations. This enables them to engage in ongoing exploration of their own epistemology of practice (Diamond, 1988).

As students encounter occasions to explore the four curriculum themes interwoven throughout the program, they also participate in tightly coordinated experiences designed to help them learn to use interpretive lenses to make sense of teaching and learning of subject matter in classrooms. These experiences take many forms (journal writing, programmatic field experiences supported by faculty and mentor teachers, class discussions, writing assignments, analysis of cases of teaching and learning designed to help students learn to analyze field visits) and become increasingly complex and comprehensive as students progress through the program.

As students progress beyond their initial courses in the program, they move from analysis of classrooms to generative tasks such as planning and teaching a unit in their mentor teacher's classroom (the term before their student teaching begins). At this point, program faculty provide occasions for students to reflect on their own planning and practice using the interpretive lenses (see Figure 1) to analyze their own teaching behavior. Then during student teaching, students write reflective pieces on their unit teaching, again using the interpretive lenses to analyze their planning, teaching strategies, classroom management, and student learning to identify ways in which they are satisfied with their teaching, and to identify ways to improve teaching strategies and increase student learning. After student teaching, their social foundations course builds on the ongoing reflective process to place issues of teaching and learning in the broader context of schooling and the teacher's role orientation (Zeuli & Buchmann, 1988).

Therefore, a particular kind of reflection that is programmatic in process and content, and is carefully structured to provide appropriate support, is what enables students to develop understanding over time of important concepts and eventually act on them in the classroom during student teaching and subsequent years of teaching. This blend of using the reflective process to understand and act on a knowledge base that equips teacher candidates to analyze and improve their practice distinguishes reflection in this teacher education context from those teacher education programs or courses that rely on the reflective process itself to somehow bring about improved teaching (e.g., Clift, 1988; Charvos, et al., 1988; Shaker & Ulrich, 1988). Using the knowledge base on conceptual change teaching to guide their planning and teaching makes reflection a powerful tool.

The Context of Reflection

The teacher education literature calls for increased use of field experiences to help prospective teachers make sense of theoretical frameworks they are learning in their professional coursework. Yet this same literature cautions that such experiences can be "miseducative" if there is too great a mismatch between the ideal and the reality of classroom life (Zeichner, 1980; Erdman, 1983; Feiman-Nemser and Buchmann, 1983).

In the Academic Learning Program, the reflective process for field assignments is supported by both program faculty and mentor teachers. The faculty work in collaboration with the mentors so that field visits have a shared focus and are geared toward helping students understand program concepts. Mentor teachers attend workshops on campus designed to help them understand the purpose of various field visits and become familiar with the concepts the visits are designed to illustrate at a particular point in time. This enables mentor teachers to help students choose appropriate times to come to the classroom, and choose particular lessons and learners on which to focus. At best, mentor teachers model program concepts in their classroom teaching. If this is not the case, they at least discuss with students their rationale for their teaching decisions, which enables Academic Learning students to understand the mentor's thinking behind their actions and compare the mentor's views with those taught in the program. Such critical appraisal of classroom practice helps them make informed decisions about their own teaching practice. Students also write analyses of their field visits as part of their course requirements. Such analyses provide opportunities to discuss with program faculty the differences and similarities in viewpoints across program concepts and teaching practices in their mentors' classrooms. In this way, the features of the context in which the field visits take place are made explicit, and students are encouraged to wrestle with teaching and learning concepts in light of what they see in actual classrooms.

In summary, the purpose of reflective activity is to help students integrate knowledge gained from research and theory with knowledge gained from classroom experience. Program faculty and mentor teachers collaborate to avoid setting up mutually exclusive worlds where students must align with either theory and research or practice. Thus, they work together to create a context for learning to teach in which exploration and analysis of research and theory can inform prospective teachers' interpretations of classroom practice. Moreover, simply reflecting about whatever is at the forefront at the moment is not enough. Students learn to use a research-based view of teaching and learning to guide their planning and teaching, and learn to value theoretical frameworks as powerful tools for improving their teaching.

Reflection as a Tool for Learning to Teach

Many students enter the Academic Learning Program thinking that the place they will really learn to teach is in the classroom. In fact, many students choose to enroll in the program because of its mentor teacher arrangement where they work with a classroom teacher throughout their two years of coursework.

They speculate that the courses might be somewhat helpful to them, but they think that an experienced teacher (their mentor) and the chance to try out their own ideas (through field visits and student teaching) will be the keys to their development as a professional.

In this section, data collected from our study of a group of Academic Learning students over a two-year period will illustrate the students' developing appreciation of ways in which theory and research can enrich their understandings of classrooms. These examples illustrate ways in which students came to appreciate the reflective process and learned the importance of using a conceptual change knowledge base for making reflection an effective learning tool.

Integrating Reflective Processes and a Professional Knowledge Base

Students in the class of 1988 were given a questionnaire at the end of their first year of coursework in the Academic Learning Program. Of the 53 students surveyed, 35 students returned the questionnaire. In the questionnaire, students were asked to rate, on a scale of 1 to 5, the relative contributions of experiences in Academic Learning classes and of field assignments and visits, and to explain their ratings. The results are shown below.

Ratings of Contributions of Course Experiences and Field Assignments and Visits

	(very little)			(a great deal)	
rating:	1	2	3	4	5
Experiences in Classes		1	8	20	6
Field Assignments and Visits	1	1	2	5	26

These results show that most of the students who returned the questionnaire valued both kinds of experiences, giving them either a 4 or 5 rating. Ratings for the class experiences were lower (mostly 4's) than for field assignments and visits, but still given a high rating. A sampling of students' comments explains their thinking:

> The readings were interesting and got me thinking...The field visits and assignments were great. Seeing and experiencing actual teaching is the best part of the program. (Course rating: 4/Field Visit rating: 5)
>
> I think the material we've covered in TE classes has been very good at making us think and analyze things better in the classroom observations. But, studying teaching can only give us ideas, beliefs, etc.--it cannot make us teach well--experience and trying things out in real situations is the only thing that can do this on a "5" degree. (Course rating: 4/Field Visit rating: 5)
>
> The development of the unit plan part by part made me stop to look at several important issues along the way, but the actual field visits put it all into reality for me and showed me how the ideas would be useful for my teaching style. (Course rating: 4/Field Visit rating: 5)

> I thought most of the readings were terrific...provided a good framework from which to view the fieldwork. (Course rating: 4/Field Visit rating: 5)
>
> I feel like I can't separate the contributions of both the classes and the field visits. By going into the field I was able to see theories learned in class in practice. And the classes helped explain what was going on in the school. Both have helped to shape my thinking of learning and teaching. (Course rating: 5/Field Visit rating: 5)
>
> Each compliments (sic) the other, as our field visits gave us experience in the classroom, we had the opportunity to discuss them with our professors. We learned about each subject area in our classes and ways to effectively teach in these areas and also to see how our mentor teachers use their skills in all these subject areas. (Course rating: 5/Field Visit rating: 5)
>
> The classes gave me an understanding and knowledge about educational theory, practices, terms, etc. The classes gave me a good base to start out from. The field experience allowed me to apply what I learned in class. It allowed me to discover my weaknesses, and discover where theory falls short of reality. (Course rating: 4/Field Visit rating: 5)
>
> Both were a great deal of value, but the field visits seemed to make the classroom material seem really applicable. That is why I rated it higher. The field visits also allowed me to see different views of teaching and learning outside of AL curriculum. Usually they gave support to our AL ideas, but some gave a nice bit of reality to contrast with the theory. (Course rating: 4/Field Visit rating: 5)

Thus, while some of these students value the field visits more, they see and value the complementary relationship between the two kinds of learning, and understand that the knowledge base they are developing through their professional coursework helps them interpret classroom life.

Barbara's Appreciation of the Reflective Process

These views were echoed by the 12 case study students whose learning and development were more closely followed over the course of their two years in the program. In interviews across the two years, they were asked four times to rate the contributions of their course and field visits. Their responses were similar to the larger group's in that they gave their field visits a slightly higher rating, and their explanations for their ratings revealed an appreciation for the complementary effects the two kinds of experiences had on their learning.

For many of the students, learning to use and coming to value the reflective process in learning to teach began early in their first course in the program. For example, Barbara, an elementary major, wrote in her journal for the learning course that she was becoming increasingly aware of the role of the reflective process in her own learning. She saw the writing assignments in the course as occasions to reflect on her own learning:

> This assignment [field assignment with accompanying written analysis on a student's learning experience in her mentor teacher's classroom] is going much better for me--now I want to do a good job not for a 4.0 but for me. I'm using this as a learning experience--sorting out all my assumptions, biases and observations to make sense of what I experienced. Reflection is a really neat part of learning-one that I'm just becoming consciously aware of (Journal Entry 10/21/86; emphasis added).

She went on to comment on how the theories she learned about in class were made concrete through examination of her own learning processes:

> Since we've been focusing on learning, I've found myself in learning situations saying, "So that's how I really learn," or "I didn't know I did that." It's kind of strange sometimes, to be learning and learning how you learn at the same time!!! (Journal Entry, 10/21/87).

This entry shows that Barbara caught on quickly to the built-in occasions for reflecting about her developing knowledge base, and that she understood the purpose of the reflection was to help her integrate her learning from study and practice.

As she continued her learning through professional study and field work, she realized how important the connections were between the process of reflecting and what she reflected about. She came to view the theories she learned in classes as frameworks for interpreting what she observed in her mentor teacher's classroom. As she looked back on her two years of course work and field experiences in the program, and rated both a 5, she explained her rating as follows:

> ...how well this all ties together. It is like in the classes, in the pre-student (teaching) field experience we are given this foundation of ideas to draw upon and they all work. It is not like you have this disparity between what they are telling you in the university and know what is going on in the classroom. Everything meshed really well. I think that is a great strength of Academic Learning. But I think without the guidance of the classroom concepts, I don't think our field experiences would have been that successful, because we always learned about things that we should be thinking about, things we should be looking for, concepts to frame our observations. And I don't think it would have been nearly as an important a field experience if we hadn't had that underlying framework (Student interview, 3/24/88; emphasis added).

Barbara was convinced that bringing an interpretive framework to her classroom experience was essential to helping her develop an appropriate focus for her classroom observations. At the same time, her focused classroom observations helped her see how theories of learning and teaching manifest themselves in classroom life. As she described in a paper at the end of her first course, "The classroom experiences brought the theory to life, further differentiating my ideas about learning and teaching." Her words communicate her perception of the gradual process of how her developing understanding would evolve over time. It would involve a process of "differentiating" her ideas, or gradually making them more clear, more succinct. She went on to say:

> As I acquire more knowledge of and experience with teaching and learning, it is important that this process of reflection, evaluation and evolution of my perceptions continue...I need to continually reassess the relationship between teaching and learning, between theory and experience so that I can achieve my goal of creating a secure environment that fosters and encourages learning where students develop creative and analytical abilities to the utmost of their ability. (Paper #4, TE 200C, 12/4/86)

By the end of her first course on learning in the Academic Learning Program, Barbara had firmly established her awareness and appreciation of the reflective process as a learning tool. Yet her appreciation of the process was tied to the notion that reflection requires direction and focus if it is to be a meaningful tool in learning to teach.

Barbara's Analysis of the Structure and Functions of Knowledge

Barbara used the theories from her courses as a "framework" for making sense of and interpreting classroom life. During the two years in the program, she and the other students in the program encountered concepts more than once, and had repeated opportunities to use them to interpret and act on theories of teaching and learning. These repeated opportunities, which were increasingly more comprehensive and complex in their treatment of a concept, gave students a chance to examine, over time, their developing understanding, and also afforded students the opportunity to try out different ways of applying the concept in the classroom context (for a detailed description of how activities were structured, see Sections II, VA, VB, Table 2 and Appendix G). In this way, theories provided ways of thinking about teaching and learning issues, and also were conceptual tools for action, for making decisions about teaching. Barbara's evolving understanding and use of concept mapping as a tool for thinking about subject matter content and of ways to organize knowledge for teaching is an interesting example of how the reflective process interacted with her developing knowledge base in the program.

In the curriculum course, the second course in the program, the notion of concept mapping was introduced as a means of pictorially representing how knowledge about a topic is structured and organized. It was introduced as a useful planning tool for making decisions about what to teach, as a teaching tool to teach students about a particular topic, as well as a tool for learning about students' current knowledge and understanding of a topic (see Novak and Gowin, 1986). In class, a great deal of emphasis was placed on studying and analyzing the number and nature of connections among concepts represented in a map, to emphasize the importance of giving students ways of organizing and making sense of discrete pieces of knowledge. In addition, the focus on connections among concepts was intended to help prospective teachers examine ways in which knowledge taught in school enables students to interpret the world around them, or use the knowledge to make sense of their daily lives. Several occasions were provided in the curriculum course and throughout subsequent courses in the program for students to use concept maps to analyze the structure and functions of knowledge in the disciplines and in classroom lessons. These occasions occurred in differing contexts (analysis of the intended, enacted and actual curriculum, etc.) (See Table 2).

Barbara experienced an evolving appreciation of the importance and usefulness of a tool such as concept mapping to help her examine her own and her students' understanding of a topic. When she was interviewed after taking the curriculum course in which concept mapping was introduced, she commented that she had some trouble with them initially, but later understood their importance. She elaborated that they make more sense to her after being in the classroom, and she eventually developed an awareness of how they help her see how things tie together.

Barbara may also have developed some of her appreciation and understanding of mapping because she tried developing some maps in her journal at the same time that she was trying to see their applicability to the classroom. For example, she voluntarily used a concept map to organize her understanding of an article she read for the course (Anyon, 1981). In this map, she placed "knowledge" at the center of the map, and tried to show how various factors discussed in the article (e.g., social class, use of text book, teacher expectations, etc.) influenced and shaped the kind of knowledge different students would develop. Later in her journal she developed a second map centering around the topic of "perpetuation of misconceptions," an issue that several articles she read for her discussion group addressed. Thus, generating maps was a tool for her to check her own understanding of course readings and discussions that centered around program themes.

The image of a "map" also influenced the way she thought about her own knowledge of the disciplines she would teach. For example, included in her journal response to an article that discussed ways to help students experience conceptual change, she commented:

> As a future teacher, I most certainly need to be able to change my students misconceptions yet at this time I have only a sketchy idea of how to accomplish this. Worse yet, I feel that I may have misconceptions -- How can I teach my students if my own map of the subject is faulty? I think it is important for teachers to be aware of their own understandings in order that they can most efficiently change the misconceptions of their students. (Undated TE 205C Journal Entry, 1987; emphasis in original)

In this case Barbara applied this new concept mapping tool to thinking about how her own knowledge of science was structured and organized. It provided a framework for her to think about her own subject matter knowledge and how that will shape her teaching decisions. This theme carried through her student teaching, where concept mapping proved to be a central focus for developing coherent objectives for her unit planning:

> ...it was like the theme of your unit and you had to seriously think about what the focus the unit was going to take, which was good. And the concept map because, this is so funny, because when (the professor) first started doing all this, I thought, "What is this man doing?" Now two years later, I think they are

> great...it forces you to sit down and figure out what you think the connections are and as you do that, you realize what you need to work on or what you are not really quite sure of. And also it gives you a frame for what you want the students to eventually pick up, although usually their concept maps aren't as sophisticated as the ones I do. And it is just a really systematic way of organizing everything so that the pieces are linked together. (Student Interview, 3/24/88; emphasis added.)

Barbara did not just create concept maps; she reflected on how they functioned in managing teaching and learning issues. They helped her assess her own knowledge, set teaching goals, and systematically keep track of her goals for her students' learning. Using a concrete way of organizing her knowledge and the knowledge she wanted her students to understand was an integral part of the way she approached planning a unit of instruction:

> Unit planning...how well that all worked...I thought that was a great way of planning units...Especially the concept map and the central focus are really important, but I would use all parts of it. (It is) just so ingrained by now and it works so well, and it doesn't take a lot of time...It is an organized manner and once you have a unit planned, your daily plans require less time because you know where you are going. You know what your major objectives are for the unit, which is really important. And one of my units, my animal unit was 9 lessons long and it was great to have that really in-depth concept list and list of objectives because in the middle of the unit, I looked back...and see where I wanted to go by the time I was done with the unit...I think also, by thinking about the concepts in such a systematic way that you help your students to have their own concept map...(Student Interview, 3/24/88; emphasis added.)

This statement reveals her appreciation for the way her decisions shape the knowledge students construct, and the way this tool can help her reach her broad goals. Thus, concept maps guided her reflective process. She used such reflection over time to understand program themes and to guide her planning and teaching. Reflection was a powerful tool for her learning.

Supporting Reflection that Draws on a Knowledge Base

By focusing and reflecting on a particular knowledge base with students over time, program faculty and mentor teachers had multiple opportunities to provide appropriate support to students in learning to use concepts to interpret classroom life and make reasoned teaching decisions. Generally, the mentor teachers focused more on helping students understand and reflect on the daily aspects of teaching (e.g., classroom management, organizing and implementing daily lesson plans), while the university faculty focused on supporting students' unit planning and reasoned implementation of program concepts at a broader level. However, mentor teachers were also involved in helping students understand broader curriculum goals by explaining their long-term as well as immediate teaching goals, and by regularly discussing unit plans as well as daily plans with their student teachers .

The concept map framework that worked well for Barbara in organizing and guiding her thinking about subject matter content was also a useful tool for faculty, mentor teachers, and students to share their understandings. Barbara worked more with her student teaching supervisor on her planning than on specific classroom issues, and commented that the concept map helped them communicate about her planning:

> He has this knack of looking at concept maps and like immediately picking out things that aren't clear, that aren't clear on the map. Is it because you weren't sure to write them, or is it because you are not sure of it? So he asked me questions and just on the questions that he asked me, I started thinking about other aspects. (Student Interview, 3/24/88)

Thus, sharing conceptual tools and working at refining them was a focus for program faculty's interaction with Academic Learning students. By deliberating on a shared knowledge base, faculty could push students' thinking, something Barbara became aware of and valued:

> When he would come in, he would press me to think about individual student needs. He would always have things that he would ask me, questions that made me think more deeply about what I was doing. (Student Interview, 3/24/88; emphasis added)

By constantly cycling back to recurrent issues related to program goals (e.g., How is this knowledge organized? How can I help students see and understand connections among concepts?), Barbara understood that her pedagogical thinking was tied to her actions in the classroom, and that careful analysis of how her actions fit with her goals could improve her ability to make appropriate teaching decisions.

In addition to having their mentor teachers and program faculty for support in reflection that draws on their developing knowledge base, students developed a collaborative working relationship with each other. In early coursework, students had opportunities to deliberate about program concepts with one another as well as individually or with program faculty. Before student teaching, Barbara commented:

> The other thing that I thought was really, that's really a strong point of Academic Learning was the fact that we can work with other people. I guess too before this, I was always an individual learner. I didn't like to work in groups. I worked best by myself. So, in the beginning when they talked about cooperative learning or learning together, it was like, "Come on folks, that's cheating." And now I see the value of working together, it's really helpful. So I think that makes me more aware of the value of having students work together in the classroom. (Student Interview 12/7/87)

Barbara came to appreciate the value of collaborative efforts in helping her develop her own understanding, and in turn valued it more as a fruitful teaching method for her students. In her interview after student teaching, she brought up the collaborative work with her peers again as a valuable way to learn, and saw it as a stepping stone to "teaching collaboratively in the real world."

Becoming a Reflective Teacher

Embedded in the Academic Learning Program's view of reflective teaching is the notion that teachers should use the reflective process to make reasoned decisions about teaching and learning issues. Using a consistent knowledge base over which to deliberate enables students to construct their own understanding of the theories they are learning by making reasoned judgments about how their own beliefs, research-based theory, and classroom reality fit together. Teaching students to do so, and to value the activity, requires providing carefully supported occasions in multiple contexts for students to develop and use concepts that will guide their thinking in making pedagogical decisions. By providing increasingly complex and comprehensive teaching and learning issues to analyze, students can learn to draw on their knowledge base to interpret and make decisions about the particular classroom situations they encounter.

By becoming more effective and skillful students of teaching (Dewey, 1904), Academic Learning students learned to use their knowledge base as a resource for making teaching decisions, instead of following the commonly reported path of rejecting their formal studies and simply learning to survive. Barbara's reflections on her student teaching term illustrate the strength of program concepts in guiding her actions during student teaching:

> Another important thing I learned is how difficult it is going to be as a beginning teacher teaching for conceptual change. There were days when I thought I did a pretty good job of that, and then there were other days I just go so bogged down by everything else that was due, and had to get done, that it didn't, it was in the forefront of my mind and that bothered me. (Student Interview, 3/24/88)

She was able to maintain her overall goals despite only partial success at meeting them on a daily basis. She understood that as a beginning teacher, she may not be able to experience success all the time. Instead of letting reality "wash out" her learning, she used what she had learned through the reflective process to make reasoned judgements, guide her actions, and maintain her ideals.

VI. ISSUES ABOUT LEARNING TO MENTOR AND THE MENTOR TEACHER/FACULTY COLLABORATIVE PROCESS

An important goal of the mentor teacher field component was to involve classroom teachers in a more active central teacher education role. Originally we had a single vision of this role: Mentors would learn from program faculty about the themes and goals of the Academic Learning Program, and they would then actively support prospective teachers in making links between their study in Academic Learning classes and their learning from experience in classrooms. However, our articulation of the mentor teacher role evolved as we learned about: The realities of mentoring within the time constraints mentors faced, the difficulties of playing both a teacher education role and a teacher role simultaneously, the slowly evolving nature of the learning-to-mentor process, and the variety of ways in which mentors could make positive contributions both to Academic Learning faculty and to Academic Learning students. Over time we developed a new vision of our partnership with mentors, creating a layered view that included a variety of productive mentor roles.

As our views of the mentor roles changed over time from a single focus to a more layered perspective and as we learned more about the knowledge necessary to mentor effectively in fulfilling different mentor roles, our ways of working with mentors also changed. Learning how to teach mentors at the same time that we are collaborating and learning from them as been an important focus of our work. We have learned a great deal about the conditions necessary for such an educative, substantive collaboration.

In this paper four issues concerning the faculty/mentor collaborative process are explored, and ways in which that collaboration changed over time are traced. The four issues are: The learning-to-mentor process, the evolution of a layered view of mentor roles, mentors teaching faculty, and changes in the faculty role.

The Learning-to-mentor Process

The challenges of learning-to-mentor. Why did we change our view of mentor teacher roles? One piece of the answer to this question is that we learned how difficult it was for mentors to develop the rich set of knowledge, skills, and dispositions needed to carry out effectively our original vision of the mentor teacher role. Developing the knowledge needed to guide prospective teachers' understandings of theory and research in classroom settings, especially given the limited time teachers had to focus on learning to mentor, was a gradual process. For example, it took a long time for many mentors to begin to shift from a teacher perspective to a teacher educator perspective and to think about their Academic Learning students as learners. Learning how to shift back and forth between their teacher role and their teacher education role also took time.

Ways in which these mentors worked differently with their Class of 88 student compared with their Class of 87 student show how mentors came over time to develop a richer view of prospective teachers as learners and how mentors' knowledge of program goals and themes evolved slowly. In their interviews most of the case study mentors talked about how their attention with the first student was largely focused on procedural issues having to do with the field assignments. They worked through the assignments one by one as a series of isolated tasks. It was only in working through the assignments a second time that they were able to begin to focus on ways in which assignments were related to each other and to program themes.

> Well, in the beginning they (the meetings) were explanatory. I didn't really have a gist of what was going to be happening, and so it needed to be an introduction to that kind of interaction between mentor/student and campus. I really think that first half year or at least the first year, I still didn't quite understand what my function was other than being in a classroom where the student could come. But into the second year they, the meetings really were a guiding light. They were a focus so that I could look a little better at what the assignments were and what the students were doing. But again I had a whole year of working with the student, so I suppose I was looking at the student a little differently and not just my function as the teacher of a classroom full of children, but rather as someone who could help and guide them, show them. That probably didn't come to a head until even the third year and then I felt that that was my function, as a model - even though that was told to us in the beginning, I just didn't feel that until I worked with one student all the way through. (Mentor interview, 4/6/88)

In addition to the time needed to learn to mentor, mentors need to develop the knowledge, skills, and disposition for effective mentoring. While both mentors and faculty recognized this need, they had different perspectives about what knowledge and skills mentors needed to develop.

Mentors' views about the knowledge needed to learn-to-mentor. Especially at the beginning, mentors wanted knowledge about logistical and procedural issues in completing the field assignments. In mentor meetings, they brought up many questions related to scheduling: Whether the students' schedules fit their teaching day (e.g., to focus on a particular subject area lesson, or to have time to talk before or afterward); whether mentors would receive the papers from the students at the appropriate time; whether mentors should call to schedule the student's classroom visit if the student had not called them. Other practical difficulties arose with each assignment: A mentor does not use a text with kindergartners so what textbook should the student use for the textbook analysis assignment? Who will pay for copying of textbook pages for students to use in their text analysis? Are the students required to give the mentor a copy of the paper?

As workshops have progressed, a recurrent topic in mentor teacher feedback is the identification of specific kinds of information they think would be helpful in learning to mentor. For example, some teachers ask for course readings so they will understand more about concepts students study (e.g., What do you mean by "approaches to teaching," "content representation," "the structure and function of knowledge," or "student development? ") Others want to know more about how to work with the students. For example, they wonder if they should provide written feedback on papers students write for the course and share with them, or whether it is better to conference with the student before or after the field visit. Others want to know more about ways to help with specific field tasks. For instance, they wonder what kind of text is best for the analysis and critique assignment, what type of student they should have the prospective teacher observe to analyze student learning, or what type of lesson they should have the student observe to analyze the intended curriculum.

From this ongoing feedback from mentors, program faculty continually learned more about which aspects of a knowledge base for becoming a teacher educator needed to be developed in mentors. They also got ideas about strategies for developing the knowledge base to which mentor teachers are responsive.

Faculty views about the knowledge needed to learn to mentor. Program faculty began the Mentor Teacher Project with the assumption that mentor teachers need to develop knowledge and skills that would enable them to support students in linking research-based theory to classroom practice. An important goal was to help mentor teachers shift from focusing solely on the teaching of children to take on the additional commitment of becoming teacher educators for novices. Faculty saw the need to balance the tension between immediate concerns for particular field experiences (helping mentors know what to expect, the assignment's focus, and ways to be immediately helpful) with long-range goals of helping the mentors develop knowledge and accompanying skills to be supportive of program goals.

One major area of concern to program faculty is the extent to which mentor teachers learn to be teacher educators. This includes understanding what the potential of their role is, as well as having the disposition to take on that role and learn to do it well. Many of these experienced teachers had worked with student teachers in the past and already held notions about what a classroom teacher can do to help a novice learn to teach. Program faculty often had a vision of that role that conflicted with or went beyond what mentors envisioned. For example, faculty saw learning-to-mentor as involving work toward multiple goals: (a) supporting students' developing understanding of course concepts as they are exemplified in the classroom context; (b) showing students how theory provides a framework for thinking about practice; (c) working with Academic Learning students' current understandings and beliefs and trying to build new knowledge and understanding out of prior knowledge; (d) helping students see the relationship between specific course concepts and how they fit into the overall context of teaching, or the "big picture"; (e) developing a mutually beneficial professional relationship that supports student learning through dialogue and worthwhile experiences while still meeting the mentor teachers' obligations to their children's learning needs; (f) identifying areas that are not or cannot be addressed in teacher education courses in which the mentor can help the prospective teacher develop understandings (e.g., knowledge about particular curricula, about particular students, about school routines and policies, etc.)

Another faculty concern is developing mentor teachers' knowledge of program themes and concepts. This issue was a frequent topic of discussion in faculty planning meetings and in debriefing sessions after mentor workshops. Faculty view mentors' knowledge in this area as essential if they are going to help Academic Learning students learn from their field assignments. It is easy enough to identify which concepts are important to a particular field experience, and to identify terminology that might not be familiar to mentor teachers. However, faculty had to be very selective about how to spend the precious hour or so they had with mentors in a workshop devoted to one particular field assignment. Not only did they need to help mentors understand the concepts (e.g., What is "knowledge representation?"), but they also needed to address the procedural issues associated with smoothly-run field visits (e.g., What kind of lesson would best suit this inquiry, and does it fit with the teachers' and students' schedules?).

Another area of knowledge that faculty identified as important in helping mentors become teacher educators is knowledge of the prospective teachers' development. For example, what do Academic Learning students understand about the classroom context, course concepts, working with a professional as a learning process? What kinds of conversations about an experienced teachers' work help a student understand theories of learning, theories of teaching, or the structure and function of curriculum? What difficulties will the students have with their role as novices in someone else's classroom? Again, these areas needed to be addressed within the time constraints of the workshops.

How to support mentor teacher learning. As the project progressed, program faculty listened to mentor teacher feedback to learn about their knowledge and skill levels in mentoring. They wanted to avoid assuming lack of knowledge if it did not in fact exist, to build on mentors' current understanding and beliefs, and to motivate mentors to identify areas needing work and to work at improving them. They carefully considered ways in which the knowledge teachers wanted was different from the knowledge that faculty thought they needed.

How to best support mentor teachers' substantive learning so they could better help students link their professional studies and practice was a recurring discussion among coordination faculty. Early efforts to present lots of theoretical and research information to teachers (in a format that resembled a lecture in a college course) quickly gave way to meetings that were primarily focused on procedures and details. However, as faculty understanding of the mentor teachers increased and as mentor knowledge of the particulars of field assignments increased, the nature of workshop topics evolved from an emphasis on procedural issues (e.g., "When is this assignment due?") to substantive ones (e.g., "What is a liberationist approach to teaching, and how does that reflect program themes?" "Why is it useful for students to analyze classroom teaching from these three perspectives?"). At the same time, the nature of workshop interactions evolved from faculty talking to mentors and answering questions to debate among mentors about course-related or teacher education issues.

These shifts were largely due to a change in program faculty's strategies in working with mentors at the workshops. The faculty has not been able to solve the issue of not having enough time to work with the mentor teachers; they would still like more. However, they developed ways of making the most of time available. They learned how to communicate more clearly field assignment expectations on the assignment sheets, and to get the assignment sheets to mentors in a timely fashion. In this way the mentors had more time to digest the expectations and to work on solving logistical problems themselves. In addition, the faculty sent key course readings to mentor teachers prior to workshops and focused discussions on how the readings illustrate concepts that would be explored in the field visits. Handouts such as examples of concept maps were used to initiate discussions about how knowledge is structured in particular disciplines, and how that structure is reflected in school curricula. Videotapes of teachers in classrooms were used to illustrate concepts (such as knowledge representation), or to illustrate ways to conference with students about a lesson. Sample student unit plans were used as a specific instance of program themes and as a springboard for discussion about ways to talk to students about their unit and daily lesson plans ("What questions might you ask this student about her understanding of the subject matter?" "How might you help this student see that some of her planned activities are more clearly linked to her objectives than others?).

Faculty also reorganized the social organization of mentor meetings. Mentors were divided into smaller discussion groups (secondary math teachers, secondary English teachers, secondary social science teachers, secondary science teachers, and two groups of elementary teachers) to encourage full participation and a spirit of exploration. Instead of having teaching faculty (which varied from term to term) lead the workshops, each coordination faculty member took the lead role with a particular small group of mentors on a regular, ongoing basis. This consistency in group leadership as well as membership fostered an increased sense of commitment to working together toward common goals. These shifts in strategies have proven helpful in providing support to the mentors in their work with Academic Learning students.

As the program faculty's teaching of mentor teachers has taken on characteristics similar to their teaching of Academic Learning students, there has been significant progress in supporting mentor teachers' growth as teacher educators. Faculty now build on mentor teachers' prior knowledge and beliefs, encourage dialogue and debate when differing views surface. This encourages mentors to question their own assumptions and to discuss them with their colleagues. Faculty have learned to communicate more clearly to mentors the knowledge base needed to become effective teacher educators. They share insights about students to help mentor teachers view Academic Learning students as novices who begin the learning-to-teach process with prior knowledge and belief systems that need to be examined and built upon. Finally, they model and foster reflection about their own teaching (of students and of mentor teachers) to help mentors realize the benefits of ongoing reflection on their work with prospective teachers. The faculty are still working at improvements in each of these areas, but there has been significant growth in mentors' knowledge, skill, and commitment over time.

An evolving, layered view of mentor roles

Learning-to-mentor in the ways faculty had envisioned was a much more gradual process than anticipated, but in the process mentors and faculty explored and redefined mentor roles. The project began with one vision of what it means to take on a teacher education role, and that vision reflected how university faculty work with prospective teachers. Essentially, mentor teachers would be taught to be like university teacher educators. Despite rhetoric in the project proposal about the important and unique contributions that classroom teachers could make in helping prospective teachers learn about practice, it was difficult to recognize such contributions at first. Faculty lamented that mentors were not actively helping students link program themes with classroom practice because they were not accomplishing these goals in the ways faculty had envisioned. Over time, largely as a result of our study of case study students and their mentors, the variety of ways in which mentor teachers could make important contributions and support Academic Learning students in understanding program goals were recognized. The mentor teachers took on a variety of teacher education roles that provided different levels of support in helping students link study and practice. Thus, a single vision of mentor teachers as teacher educators gave way to a richer, layered view.

The mentor teachers working with the case study students illustrate the different roles mentors played and the ways in which each of these roles accomplished at different levels the goal of supporting students in linking their study of program goals and their learning from experience in the field. Consider four mentor teachers' ways of supporting students in using ideas about conceptual change, concept mapping, and students' misconceptions in science to analyze lessons taught by the mentor (in the curriculum course) and to plan and teach a science unit (during the science methods course).

Layer One: Providing information and opportunities. Mentor A, an elementary teacher, had never heard of conceptual change ideas before working with the Academic Learning Program, and she generally did not even teach science (teaming with another teacher to cover social studies and science instruction). Without knowing very much about how to analyze the science curriculum from a conceptual change perspective, Mentor A still played a valuable role in helping her student, Marian, develop deeper understandings of conceptual change science teaching. She did this by responding thoughtfully to Marian's questions, by asking clarification questions, and by allowing Marian to try approaches that were different from her own.

Mentor A opened up her classroom to Marian for analysis and responded to Marian's questions. These questions, which were often suggested in the directions for the field assignments, elicited Mentor A's ideas about teaching science and her insights into children's thinking. In planning a science unit about electricity, for example, Marian turned to her mentor for ideas about possible student misconceptions and for her mentor's assessment of how students might respond to the planned activities. Thus, Mentor A provided Marian with information about students' prior knowledge that would enable her to use a conceptual change model more effectively in planning her science unit.

Some of the information that Mentor A provided about science teaching and learning was not directly applicable to the unit planning process. But this information was useful to Marian in analyzing ways in which conceptual change ideas are or are not integrated into her mentor's planning and teaching. Again, this played an educative role for Marian, stimulating her to compare the ideals taught in her courses with the realities in her mentor's room. In her post-student teaching interview, Marian described how throughout her two years in the program she had continually reassessed the extent to which her mentor was a "conceptual change teacher." During the science unit teaching experience, Marian had felt that her mentor was not a conceptual change teacher. Later, as she came to know more about her mentor's approaches to teaching in other subject areas, she was able to identify a number of ways in which her mentor's teaching was consistent with some important aspects of conceptual change teaching.

Mentor A also played an important teacher education role by asking clarification questions. For example, she was truly puzzled by concept mapping and asked questions like, "What do you mean by a concept map?" "Why are you doing this?". These questions challenged Marian to explain her thinking and to check her own understanding of the purposes of this assignment.

Finally, Mentor A supported Marian in making links between research and practice by allowing Marian to try new approaches. She gave Marian suggestions about possible pitfalls and management issues to consider in trying new approaches, but she did not discourage or in any way undermine Marian's efforts to try something different. For example, Marian wanted to involve students in small group work, a break from the mentor's focus on whole-group instruction. Mentor A was receptive to this idea, helped Marian think about potential problems, and encouraged Marian to try it again even when the first attempt had some rough spots.

Layer 2: Teaching about practice. Teachers at the first level were primarily responsive to students, reacting to students' assignments and questions. Some mentors went beyond this reactive role and identified key aspects of practice that they wanted their students to learn about. Frequently, the area they selected was classroom management and student discipline.

Mentor B, who taught in an inner city elementary school, believed that her Academic Learning student needed to be very knowledgeable about classroom management and discipline routines if she was to succeed with this group of disadvantaged second graders who were crowded into a small, semi-open classroom. Because her student, Kristin, visited the classroom regularly (beyond the times required for specific field assignments), Mentor B had the opportunity to teach Kristin about approaches to management. She talked to Kristin about strategies she had found to be effective, she explained why she had taken certain actions during class, and she allowed Kristin to try out some of these strategies in small chunks (handling the opening routine, walking the class to the gym, etc.). Kristin appreciated this guidance and felt it contributed in important ways to her initial success in teaching the science unit and her later success during student teaching. As Kristin explained, maintaining control and cooperation of the students was essential if she was going to be able to teach for conceptual understanding.

There were times that Mentor B's teaching about practice conflicted with what Kristin was learning in her courses. For example, Kristin's mentor did not believe that this group of second graders could work productively in small groups. The students were too immature to cooperate, and they would get too noisy and unruly. In Academic Learning courses, however, Kristin was hearing that children need opportunities to talk about their developing ideas and that "cooperative learning" in small groups is a particularly effective teaching strategy. Such conflicts often were particularly educative for Kristin. In her teacher education class, she shared her mentor's perspective with faculty and classmates and reconsidered the notion of cooperative learning in light of the reality at City Elementary School. She also probed her mentors' thinking and reasoning further and wrote about the conflict in her journal. In struggling to resolve the conflict, she learned about the complexities of intertwining knowledge gained from research with knowledge of practice. She was convinced that these students would benefit from talking more, but she also saw how disruptive it might be in this open classroom setting if her students got too noisy. During student teaching, she generally demurred to the practical issues and taught the group as a whole, but she also found ways to include activities in which students were talking together.

Layer 3: Learning together. Like Mentor A, Mentor C responded to her student's questions and provided a supportive setting for Barbara to try new approaches. Like Mentor B, she taught Barbara about aspects of practice that went beyond the boundaries of the "official" field assignments. For example, she emphasized the importance of looking at each child from social and emotional as well as academic perspectives and shared insights about her students' personalities, home life, interests, and academic abilities. This emphasis played an important role in Barbara's ongoing reflection about conceptual change frameworks for thinking about teaching: Barbara worried about the balance between treating children as "minds" and treating them as people.

But Mentor C added another layer to her work with Barbara; she eagerly learned about conceptual change ideas along with Barbara. Mentor C was a Kindergarten teacher who was very active in promoting and supporting science teaching in her suburban district. Despite her interest and knowledge about science teaching, Mentor C was not familiar with the conceptual change research base. However, she was eager to learn about it. As she and Barbara worked on field assignments and unit plans together, Mentor C found conceptual change ideas to be compatible with her own thinking about science teaching. She quickly saw the value of the concept mapping tool. While most of the faculty had not really considered how to adapt this teaching perspective for kindergartners, Mentor C had no trouble making this connection. She and Barbara often seemed to be working as colleagues -- inquiring, planning, and reflecting together. Thus, Mentor C took an active role in helping Barbara make connections between conceptual change theory and teaching kindergartners about science.

Layer 4: Teaching about conceptual change. Mentor D was a middle school science teacher who had previously learned about conceptual change perspectives through his participation in a research project directed by three Academic Learning faculty members. In this project, he had had the opportunity to teach two units using curriculum materials that were built around a conceptual change model of instruction. Mentor D had found this approach to teaching to be compatible with his own emphasis on conceptual development but to enrich that perspective with more careful analysis of students' thinking. Thus, when conceptual change ideas were discussed in mentor/faculty meetings Mentor D was revisiting and deepening his understandings of these ideas rather than encountering them for the first time.

Because Mentor D had this knowledge and valued it, he could take a proactive role in helping his student, Dave, develop his understandings of program themes in the context of a seventh grade life science class. Mentor D did not always successfully model conceptual change teaching. However, he knew when he was not teaching for conceptual change, and he could articulate for Dave his reasons and dilemmas. In a lesson Dave observed about nutrients, for example, Mentor D basically went through each nutrient and its function, telling students about each one in a didactic fashion. He explained to Dave that this was one of those pieces of the curriculum that he did just did not know how to think about in terms of student misconceptions and conceptual development. It just seemed like information that students need to be told and to memorize. Thus, Mentor D took an active role in helping Dave struggle with the day-to-day issues he would face in using a conceptual change teaching model. He had the knowledge of the research base of the program to really challenge his student's thinking.

Layer 5: Modeling conceptual change teaching. Some mentors modeled important aspects of conceptual change teaching. Dave's mentor, for example, modeled a focus on the development of understandings of a few central concepts rather than broad coverage of long lists of facts and vocabulary. In teaching certain units, he was particularly knowledgeable about students' misconceptions and taught in a way that was responsive to these student conceptions. Karen, a secondary English major, often viewed her mentor as modeling approaches studied in Academic Learning courses. This modeling by her mentor played an important role for Karen, convincing her that the ideals taught in her teacher education courses could be translated into action in real classrooms and that such teaching was important in terms of student outcomes.

However, mentors did not consistently model a reflective, conceptual change stance toward teaching. Our analysis of the various mentor roles and their impact on students shows that such active modeling of conceptual change teaching is helpful to prospective teachers, but it is not the only way to help students deepen their understandings of conceptual change perspective. Each of the layers of support can play an educative role in helping students link conceptual change research and classroom practice.

Certainly, we would like to have mentors develop multiple layers into their mentoring. While Mentor A's minimal level of support proved sufficient to help Marian develop meaningful links between research and practice, not all students can succeed with this minimal level of support. Dana, for example, had a mentor who was very responsive to her requests for information. Like Mentor C, he knew little about conceptually-focused teaching but was eager to learn about it. In his case, however, he taught mathematics in more procedurally-focused ways that did not model a conceptual change perspective. Dana's view of mathematics and math teaching was firmly entrenched in such an "executive," rule-based framework, and her mentor's level of support was insufficient to help Dana change this view. She needed someone operating at level 4 or 5 to challenge her to change her conception of good mathematics teaching.

Thus, there are a variety of layers of productive mentor roles. Each layer contributes to the teacher education process, fostering in different ways prospective teachers' attempts to integrate their studies of research and theory with their classroom-based understandings. Prospective teachers differ in the level of support they need to undergo their own conceptual change about teaching and learning.

Mentors teaching faculty

Because an important goal of the Mentor Teacher Project was to help mentors understand program goals and the conceptual change research base, most of our discussion of the mentor/faculty collaboration has focused on ways in which faculty attempted to teach mentors. An equally important part of this collaboration, however, is the ways in which faculty have learned from mentors.

In addition to their direct work with Academic Learning students in the field, mentors also contributed to the teacher education process by teaching Academic Learning faculty about their curriculum, about the difficulties they saw in enacting program goals in classroom teaching, and about the Academic Learning students' strengths and weaknesses in the field. Thus, mentors made critical contributions to the collaborative process by helping to shape the program courses and field assignments in ways that helped prospective teachers understand conceptual change ideals as feasible to pursue in real classrooms.

One example of this grew out of mentors' concern that classroom management issues were not being dealt with effectively in program courses and field assignments. The mentors' persistence in this area forced faculty to rethink the ways in which classroom management was addressed in the program.

Initially the faculty did not address management issues extensively, believing that careful planning of meaningful student tasks would go a long way toward preventing disruptions and assuring smoothly-run lessons. In response to mentors' concerns about students' failures to attend to important management details in planning, however, faculty devised ways of integrating management issues into their courses within the framework of conceptual change teaching. Thus, management was not treated generically in a separate course, as many mentors advocated. Rather, Academic Learning students were forced to grapple with these issues repeatedly within the context of unit planning and teaching in the various methods classes and within a framework of the conditions needed for effective conceptual change teaching. Elementary majors studied management issues in three different methods classes.

Management issues were also woven into field assignments in much more systematic ways. After piloting of the field sequence, several changes and additions were made in the field assignments to address management concerns. For example, elementary majors in the Class of 88 had a new field assignment at the beginning of their second year. In this assignment, the prospective teachers observed their mentors' classrooms for the first three days of the school year, analyzing the establishment of management routines. Students analyzed and wrote about the details of these routines. Later, in the context of the interdisciplinary curriculum course, they discussed these strategies in relationship to research articles they were reading about classroom management issues. The students wrote on end-of-student-teaching questionnaires that this field assignment was one of the most important field experiences. In this revised field experience sequence, secondary majors were helped in two ways to consider classroom management issues in their initial unit planning and teaching assignment. First, the methods course instructors addressed management issues in course readings and discussions. Secondly, students visited the mentor's classroom once a week (1/2 day) throughout the Spring term. During these visits, mentors took the lead in providing experiences that would help students develop deeper understandings of program themes and classroom management issues. Prior to teaching their units, Academic Learning students were required to go over their daily plans with their mentor, with an eye toward identifying potential management problems. Thus, students were supported not only in developing conceptually-focused units but also in attending to the details that would enable them to keep the lesson focused on conceptual issues.

Regular interactions with mentors also forced Academic Learning faculty to tie their thinking about conceptual change ideas to actual school curricula. In the past, Academic Learning students got the message that they needed to abandon the typical school curriculum and practically construct a new one from scratch in order to teach for conceptual change. This contributed to students' perceptions that conceptual change teaching was too idealistic for use on a regular basis in classrooms; they recognized they did not have the time or ability to build singlehandedly a new school curriculum. Working with mentors and the particular curricula in their classrooms pushed faculty to think about conceptual change ideals in new ways. They began to develop ideas about how to help students adapt existing curricula in meaningful ways. As the faculty themselves struggled with the unit plans students were developing, they were forced to translate their ideals into specific cases. Thus, students saw faculty modeling ways to rethink existing curricula, to use the curricula as a base, and to frame the curricula in ways that would be more supportive of students' conceptual understanding. This process played a critical role in enabling the prospective teachers (and their mentors) to see conceptual change teaching as possible and realistic for classroom use.

Mentors also provided faculty with important insights into Academic Learning students' development. They had the opportunity early on to observe the Academic Learning students interacting with children and trying to implement concepts and teaching strategies learned in courses. Mentor feedback to faculty about Academic Learning students' work in the classroom provided information that helped faculty to refine field and course assignments, to define more clearly expectations for student work in the field, and to identify students whose difficulties required special attention. As a result, students were more closely supervised during student teaching, there were more instances of students who were given special experiences prior to beginning student teaching, and there were more students who had to delay beginning student teaching or to continue student teaching beyond the usual 11 weeks.

Changes in the Faculty Role

The dual level of planning.

The Academic Learning Program's field experiences require of faculty two levels of planning. One level is developing the intended curriculum for Academic Learning students in the two foundations courses. This includes developing field experiences that appropriately highlight course concepts and provide ways for prospective teachers to understand them as they occur in classroom practice. A second level is developing the intended curriculum for mentor teachers so that they understand the purpose of field assignments, have the knowledge and skill needed to support students' learning, and have the disposition to take on a mentoring role as the faculty has defined it.

This study has shown the complexity of contending with these two levels of planning, and several problems associated with it. At the course level, teaching faculty address problems associated with teaching prospective teachers knowledge, strategies, and habits of reflection that will enable them to teach pupils to understand subject matter knowledge in meaningful ways. In addition to solving practical problems (e.g., time and scheduling constraints), faculty help students learn to work with an experienced professional and to use field visits to understand how course concepts are embodied in classroom life. They also help Academic Learning students shift their perspective from that of a student to that of a teacher, and learn how to benefit from concurrent study of theoretical frameworks for thinking about teaching and study of classroom practice. Faculty aspire to help students go beyond the immediate benefits of their experiences in the field and to learn how to learn from their own classroom experience in the future. Thus, planning the intended curriculum for professional studies of this nature requires careful attention to the lifelong learning process as well as to the particular concepts and strategies being taught in the courses.

At the mentor teacher workshop level, coordination faculty address several areas in their planning. One area is making sure mentor teachers understand the field experiences in ways that enable them to support Academic Learning students' learning. This includes helping mentor teachers understand procedural details and how to work them out. In addition, faculty help mentors understand the concepts that are central to each field experience, and figure out how to help Academic Learning students analyze the concepts and understand how they apply to a classroom setting. Faculty provide experiences for mentors to learn about prospective teachers as learners and to develop ways to analyze their own teaching, so they can communicate to students what they do in their classrooms and their reasons for approaching their teaching in the ways they do. Faculty communicate closely with the mentor teachers through workshop interactions to learn about them as learners, and to figure out what their future learning needs are.

This dual level of planning has been successful because of the overlap of faculty across the levels of planning, and because of this group of faculty's broad commitment to program goals that go beyond an immediate commitment to one particular course. The faculty actively work at building on students' learning from one term's field experiences to another. For example, in the team planning session in the curriculum course (TE 205C), the faculty view their starting point as picking up where faculty in the learning course (TE 200C) left off. The TE 205C faculty select key readings from the previous course to review with their students, refer to what was learned from TE 200C field experiences to prepare students for their current visits, and use what they know about their students' understandings of TE 200C concepts as a starting point for developing their own plans. Likewise, TE 200C faculty planning efforts and course content include ways in which students can become acquainted with their mentor teachers and their classrooms that will serve as a foundation for all their subsequent field experiences and not just for their experiences in TE 200C. The faculty teams for both courses are committed to getting the students off to a good start in the program, not just in their course. The overlap of faculty across the two planning groups (course planning and workshop planning) enhances the group's commitment and facilitates close communication across the two efforts.

Teaching by remote control. Teaching students through the field experiences as they are structured involves teaching in an indirect way. Faculty rely on mentor teachers' commitment, knowledge, and skill to help students learn from field visits, and therefore only indirectly teach, or teach by "remote control".

This study has shown that indirect teaching through field experiences has its own set of issues. One issue faculty contend with (discussed in the previous section) is the addressing the dual level of planning, which requires regular, coordinated efforts across a group of faculty. Efforts of this nature require the kinds of commitment shown by the Academic Learning faculty to teaching their courses as part of a set of courses, not as individual entities. This includes helping students develop a relationship with mentor teachers that will last longer than the duration of their course. In addition, faculty need to create opportunities for students to tie or build on learning from one course to another, instead of focusing solely on creating experiences specific to the needs of their course.

Second, teaching students to make linkages indirectly (throughout their classroom experiences) is rewarding if it works well, but frustrating when it does not. Faculty have control over some of the aspects of making the experiences work, such as design of the field experiences and follow-up written assignments, design of the workshops to prepare mentor teachers for the experiences, and contact with students during class time to reflect on the experiences. However, there are several areas over which they do not have direct control: (a) the nature of the school curriculum; (b) the extent to which the mentors' practice provides an opportunity for students to understand program themes; (c) the mentor's level of commitment to take on and become better at the mentor teacher role; (d) the extent to which mentors use field time to work on their own goals for the student instead of program goals. It sometimes takes imagination, adaptation, and additional support to help prospective teachers analyze very procedurally-focused lessons (such as spelling or grammar lessons) from a conceptual change perspective. It would be much easier for students if their early observations could focus on conceptually rich lessons.

As faculty work with mentor teachers over time, they get ideas as to how to cope with these issues of control. For example, faculty design course assignments so they focus more closely on analyzing and understanding existing curriculum, so the link between theory and practice is more explicit. Students learn about the ideal through study of research-based theories, but then use the theories to examine existing curriculum to understand how it actually shapes student understanding in classroom settings. The opportunity to study aspects of existing curriculum such as the relationship among the intended, enacted and actual curriculum allows students to situate the ideal in a real context.

In addition, faculty actively work with mentor teachers to foster a high level of commitment to understanding and taking on a mentoring role. They provide examples of the kinds of analysis students will be doing for particular field assignments so that mentors can arrange for students to observe lessons that more closely meet their needs for the assigment. The faculty also provide occasions for mentor teachers to confront them and each other with competing views of how field time should best be spent, so that the faculty and mentors can see each others' points of view. While faculty work at getting mentor teachers to at least understand program themes and help prospective teachers understand them, they also listen to mentors' ideas about other areas program experiences should address. They respond to those suggestions by considering places in the program's coursework where issues that mentors raise can be addressed during field visits as well. They not only respond to the mentors' suggestions for topics on which to focus, but also responds to the mentors' desire to leave the design of the experiences to the faculty. Mentors feel more comfortable (in terms of knowledge and time spent) playing an implementation role in the field experiences rather than a design role. Faculty plan to design further field experiences (which mentor teachers will help implement) that address areas mutually agreed upon as needing attention. Thus, while faculty do teach by remote control in one sense, the key to preventing frustration seems to be regular, open communication with mentor teachers and students about how the field experiences shape student learning. Again, closely coordinated efforts help make the field experiences a success.

Creating and Supporting Educative Field Experiences: Mentor Teacher/Faculty Collaboration

The goal of the Mentor Teacher Project was for teacher education program faculty and classroom mentor teachers to work together in supporting prospective teachers' efforts to link their study of research and theory with knowledge gained from practical experience in the classroom. Mentor teachers would become knowledgeable about program goals and the conceptual change research base and would use this knowledge to guide their interactions with prospective teachers in the field. Thus, the collaboration of faculty and mentors would focus on the substance of the Academic Learning courses, so that mentors and faculty would share the same agenda in working with prospective teachers.

As the project progressed, however, the difficulties in achieving this goal became apparent. Initial efforts to "turn mentors on" to the conceptual framework of the program were met by mentors with a seeming lack of enthusiasm and with requests for more procedural information. Faculty responded by considering changes in the goals of the project. Why not let mentors operate on their own agenda and let faculty operate on theirs? Maybe the best that can be expected is for mentors to provide a supportive, flexible environment in which the prospective teachers can work.

While such compromises were frequently discussed, the coordination faculty (mentor teacher group leaders) persisted in structuring meetings in ways that would help mentors learn more about the program as well as about procedural issues. Over time this persistence enabled some mentors to take on a variety of educative roles in guiding students' experiences in the field. These mentors came very close to matching the original goal, closely guiding their students' efforts to link the concepts studied in courses with experiences in the field.

These successes have important implications for teacher education. Classroom teachers can take on meaningful and substantive roles in creating and supporting educative field experiences for prospective teachers. However, classroom teachers need support in developing their knowledge, skills, and dispositions as teacher educators. Learning to mentor effectively in this program required teachers to delve into the substance of the program - to grapple with new ideas and teaching approaches and to confront ways in which their own teaching was compatible with conceptual change ideals. As teachers were faced with making such links, faculty also confronted the difficulties in implementing conceptual change ideals in classroom. This process enabled both mentors and faculty to be more effective in helping prospective teachers learn how to use a conceptual change framework for integrating their experiences in the classroom.

We have identified some important issues in the learning-to-mentor and in the faculty/teacher collaborative process. We have had some successes in changing the teacher's role in the teacher education process without changing the structure of teachers' workplaces. The collaborative process holds even more promise, however, if teachers' work as teacher educators could be formally acknowledged and built into their work structure. Their contributions and effectiveness would be enhanced if teachers were given release time to meet with faculty, to study the research base of the teacher education program, and to work with prospective teachers. The mentor teachers frequently voiced their need for additional time with their students and with the faculty and their belief that release time would enhance their effectiveness. We hope this project will stimulate others to think creatively about ways in which classroom teachers and faculty can work together to create and support field experiences that will be truly educative and transforming.

VII. REMAINING QUESTIONS AND FUTURE DIRECTIONS: IMPLICATIONS FOR TEACHER EDUCATION

Our findings about the learning-to-teach process and the collaborative process in working with mentor teachers have been informative in two major arenas. In addition to documenting and describing the program themes and experiences that help our students learn to teach with a conceptual change orientation, we have learned a great deal about ways in which we can continue to revise and develop the program to better facilitate our students' integration of their learnings from professional study and classroom practice. Our findings also provide insights into important issues to consider in working toward reforms and improvements in teacher education such as developing alternative arrangements and contexts for learning-to-teach (e.g. professional development schools and post-baccalaureate programs).

Plans for Continued Program Development

We are convinced that the coherence and linkages across program content and experiences in the Academic Learning Program have contributed in major ways to our students' success in learning-to-teach. Actively supporting a conceptual change process in our students by eliciting and challenging their current beliefs, helping them develop a conceptually coherent framework for teaching and planning, and providing occasions for them to use their developing frameworks to analyze classroom life enables them to act on their knowledge base gained from study and practice. Study of our students' learning process has helped us identify ways to revise and strengthen the knowledge base and experiences in the program.

Coherence and Linkages Across Program Experiences

We plan to work at developing more coherence and linkages across the program by continuing our focus on the unit planning process across program courses. Currently, our elementary majors have the opportunity to try out the unit planning process in their science methods course and in an interdisciplinary learning course. We have future plans to integrate the planning process into students' mathematics and social studies methods courses as well. Thus, we will increase the number of occasions students have to revisit and re-think program themes from different subject matter perspectives. In addition, the language arts practicum in which students participate the term before student teaching has been rather loosely structured with few specific requirements for proactive planning and teaching. In recent meetings with mentor teachers, we have deliberated about ways to involve students actively in planning and teaching responsibility during their practicum term so that they do more than implement the mentor's plans or try out individual strategies they have learned about. Instead, students will be encouraged to use the unit planning framework they are learning about in their various methods courses and adapt it to the language arts curriculum in their mentor's classroom. This will lay further groundwork for the student teaching term when students will take full responsibility for language arts instruction.

There are fewer opportunities to support the planning process for secondary majors, who take only two methods couses: A methods course in their major (taught by faculty in the students' respective major's department) and a content area reading course. Secondary students majoring in science, mathematics, and social science take a content area reading course (taught by program faculty) the term before they student teach. In this course, they try out the unit planning process and teach a unit in their mentor teacher's classroom. Since English majors take a different reading course not taught by Academic Learning Program faculty, the unit planning format is taught and tried out during the English methods course instead. Program faculty have arranged for this by working closely with members of the English department.

Program faculty have come to realize that support for the planning process must continue during student teaching if program themes are to be consistently emphasized and developed across the learning-to-teach process. Unit planning requirements used to be framed in terms of completing two "required units" that would be more fully developed (and handed in to the university supervisor) than the student teachers' other unit teaching. These requirements have been altered significantly to encourage students to use the unit planning requirements on an ongoing basis as a framework for all their planning and teaching, instead of seeing them as a university requirement to be fulfilled. With the revised requirements, students focus on developing a format for writing their plans that encourages them to think about key questions along the planning process (e.g., key concepts to be taught, students' current knowledge of the subject matter, alternative ways to represent concepts), and that is realistic for them to keep up with on a daily basis. The only written assignments to be handed in to the university supervisor are two reflective essays in which students analyze the success of their planning and teaching for two units. Changes in student teaching planning requirements were piloted with the elementary majors last year and were very successful.

Improving the coherence and linkages across program content and experiences requires continued faculty collaboration that is focused on finding ways to help students understand specific course content in the context of the broader learning-to-teach process. This kind of faculty commitment to contributing to program (and not just course) goals is key to developing future improvements.

The Need for An Additional Interpretive Lens

Our study of students' developing understanding of the four curriculum themes that are central to learning-to-teach with a conceptual change orientation has revealed some success stories (see p. 5 for an overview of themes). As our sample cases illustrate, some students understood and were able to act on these themes in their planning and teaching better than others. Our cases also revealed that our students had more problems in one area than any other: Understanding the social context for teaching and learning for conceptual change. Included in this category are problems with the development of appropriate learning environments for conceptual change teaching and problems with the organization and management of instruction. In most instances, the problems we saw were with students making decisions about ways to organize their learning environment or manage their classroom that were not consistent with developing conceptual understanding (e.g., avoiding the use of cooperative learning groups as a teaching strategy because they cause disruption in the classroom). As reported earlier, some of these problems stemmed from some of the mentor teachers not understanding, supporting, or modeling program themes, so that students were not seeing how conceptual change teaching operates in actual classrooms.

We have identified a larger issue that may more fully account for the problem, which is that the program does not provide a well developed conceptual framework for understanding and making sense of the social context for conceptual change learning. Earlier research in the conceptual change literature focused primarily on individual students' interpretations of subject matter concepts, describing ways to elicit and challenge students' misconceptions and ways to help them restructure their understanding (e.g., Nussbaum & Novak, 1976; Posner et al., 1982). Thus, we have used this research base in the program to help students develop and use interpretive lenses to understand teaching, learning, and subject matter (see Figure 1). However, we do not specifically help students develop and use an interpretive lens for understanding the social context in which this pedagogical relationship unfolds. More recent discussions in the literature of conceptual change teaching and learning are beginning to address this issue (e.g., Madsen-Nason and Lanier, 1986; Roth, Anderson & Smith, 1987; Anderson & Roth, in press; Anderson, in press). Drawing on this developing knowledge base regarding the appropriate social context for developing conceptual understanding of subject matter, we intend to provide more support for helping our students develop an additional interpretive lens. They would learn to see and analyze the kinds of social interaction (e.g., open-ended, exploratory discussions; cooperative learning groups) and assignments and activities (e.g., use of concrete and pictorial representations of concepts; concept mapping) that promote conceptual understanding of subject matter. Moreover, the framework we use in our elementary methods courses for analyzing classroom management will be more closely and explicitly linked with purposeful analysis of appropriate learning environments for facilitating conceptual change. We are exploring appropriate points in the program, and ways to bring out more explicitly aspects that pertain to the social context in which conceptual change teaching and learning takes place.

The Need for Better Subject Matter Knowledge

As Academic Learning students begin to learn about the subject matter knowledge needed to teach in a conceptual change manner, they are quick to identify a sound subject matter background as a necessary part of their teaching. In fact, many students expressed real concern about their own knowledge level and whether it was adequate to engage in conceptual treatment of subject matter. This concern is echoed in the teacher education reform literature, where it is argued that teacher candidates must enter teacher education programs with a broad and yet comprehensive enough subject matter background to make effective use of theories of teaching and learning.

Recognizing this need in our students, we are piloting and evaluating the impact of a new mathematics course sequence for elementary teaching majors. This 3-course sequence is designed to help teacher candidates develop meaningful understandings of basic mathematics concepts. In addition, students will develop and teach two units during their mathematics methods course the term prior to student teaching so their newly developed understandings of the subject matter content can be applied to a pedagogical situation.

Our study of our students' development has shown that early and gradually deepening analysis of subject matter issues that are situated in actual classrooms helps teacher candidates re-evaluate their own understanding of the discipline(s) they plan to teach, and helps them to think about the learning of subject matter in terms of its structure and functions. Accordingly, our close focus on analysis of school curricula, how it is structured, and how the knowledge and skills will be used, shapes teacher candidates' concurrent learnings in their own subject areas studies as well as increasing their knowledge base for teaching. Thus, they gradually come to think of learning in their discipline(s) differently for themselves as learners, as well as for their prospective pupils. Supporting this reflection of their personal learning processes across the program experiences helps these novices focus differently on all their studies, and structure their own learning in ways that will help them be better teachers of subject matter.

Teacher Education Reforms

There seems to be a consensus in current descriptions of needed reforms in teacher education (Holmes Group, 1986; Carnegie Commission Task Force, 1986) that teacher educators should facilitate the development of thoughtful, reflective teachers who make reasoned decisions about what subject matter to teach and how to best teach it. That is, teacher educators want to see teachers who help children conceptually understand worthwhile subject matter content. Yet there are still competing views of how to realize this goal such as: How the teacher as learner should be conceptualized; the nature of support required for learning to teach; and the appropriate context for such learning. The findings from our study of the learning-to-teach process have furthered out thinking in these areas.

Learning-to-Teach as Conceptual Change

Descriptions of the learning-to-teach process in the two-year Academic Learning Program illustrate a process of conceptual change in prospective teachers. This process does not set up learning from theory and research and learning from experience as mutually exclusive choices, but instead illustrates ways to help teacher candidates integrate knowledge gained from both kinds of learning activities. This view of the teacher as learner is drawn from a constructivist view of the learning process where learners actively construct and make sense of learning experiences, which contrasts with views of learners as receivers of information, or developers of teaching skills. Thus, we have shown that it is important to acknowledge and elicit prospective teachers' prior knowledge and experience in the learning-to-teach process. Providing occasions for students to bring tacit knowledge, beliefs and assumptions about teaching, learning, and subject matter into focus for close analysis enables them to build on, reshape and newly construct their understandings of program themes. Thus, prior knowledge, beliefs and assumptions developed over many years as learners do not go unchallenged, only to resurface as a way to survive when these teacher candidates meet the realities of classroom teaching. Additionally, by challenging prior assumptions and beliefs, students are more aware of influences on their ongoing interpretations of research and theory. They are more than mere receivers of information, and learn to measure the extent to which various sets of beliefs fit together into a coherent view of teaching and learning.

At the same time students are exploring and challenging their prior knowledge and beliefs over time, they are actively constructing new understandings in two settings. Trying to understand how research and theory apply to learners in actual classrooms with particular curriculum materials requires a kind of integration that allows them to make personal sense of their learnings. They must confront discrepancies, non-examples, and problems as they are lived out in classrooms in addition to learning to understand the ideals of conceptual change teaching.

Supporting Conceptual Change Through Study and Practice

If students are to adopt a conceptual orientation that goes beyond mere comprehension and becomes a part of their planning and teaching behaviors, they need a particular kind of support over time to gradually develop teaching knowledge and skills. In the Academic Learning Program, multiple occasions to make sense of program themes are provided across the program courses so that prospective teachers can gradually deepen their knowledge and understanding over time. Moreover, occasions are increasingly complex and comprehensive over time to challenge students to integrate different aspects of the teaching, learning, subject matter relationship into a conceptually coherent view. Thus, support is programmatic in content (emphasizing consistent program themes across experiences) and across experiences (gradually increasing the complexity and comprehensiveness of analysis).

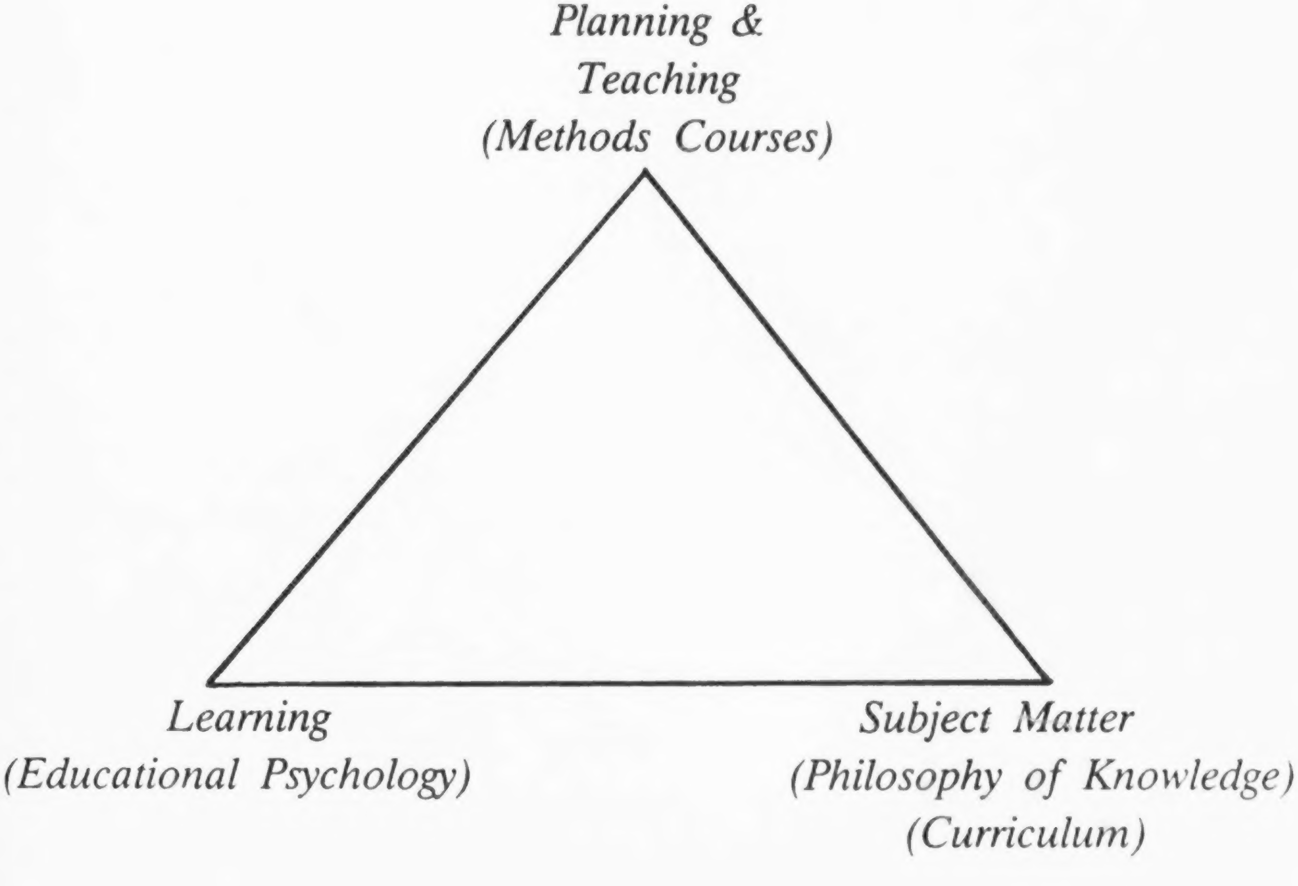
The alternative model for early field experiences described in the report is one way of providing educative experiences that support conceptual change in teacher candidates. This model shows how collaboration among program faculty and mentor teachers enables the learning process to be supported in a coordinated fashion in two contexts (in formal study and in learning from classrooms), and requires integration of ideas across the two learning contexts. The collaborative process helped both faculty and mentor teachers avoid forcing Academic Learning students to choose between two worlds, and instead to understand how the two worlds inform one another. Our findings suggest that teacher educators should be open to seeking multiple roles for classroom teachers in the learning-to-teach process; not all teachers can or will provide the same kinds of talent, skill, knowledge, or disposition to be the same kind of teacher educators. Thus, as reforms in teacher education call for creating alternative learning contexts such as professional development schools, careful attention to using the collaborative process to learn from one another, to support development of a consistent knowledge base across experiences, and to make explicit and discuss differences between research and theory and practice will better support the learning-to-teach process.

Our findings also suggest that teacher educators designing alternative teacher education arrangements must take on complex roles. In the Academic Learning Program, the faculty are committed to helping students understand program themes in addition to course themes. This requires consistent communication among faculty, and among faculty and mentor teachers, about their course goals and experiences, and a willingness on the part of faculty to have others comment on and scrutinize the usefulness of the course content and experiences. Second, many of the faculty take on the responsibility of supporting mentor teachers in learning-to-mentor as well as supporting prospective teachers in learning-to-teach. This double work load of planning and providing support for two sets of learners is complex and demanding.

Finally, our findings suggest that prospective teachers need to grapple with subject matter issues throughout the learning-to-teach process. As reforms in the organization and sequencing of experiences in teacher education programs are considered, it is important not to divide arbitrarily "foundations" of teaching into sets of pre-education experiences that focus on general discussions of teaching and learning, while saving subject specific issues for the "methods" portion of learning to teach at the graduate level. Tracking our students' learning over a two-year period has illustrated the important influence of studying teaching and learning issues in subject-specific contexts throughout the learning-to-teach process. For many students, major shifts in their thinking about their disciplines and about how one best learns a particular subject were key to enabling them to implement a conceptual change orientation to teaching.

FIGURES

Figure 1:
Interpretive Lenses for Understanding The Pedagogical Relationship


Planning & Teaching (Methods Courses)
Learning (Educational Psychology)
Subject Matter (Philosophy of Knowledge) (Curriculum)

TABLES

Table 1

Course Sequences for Elementary and Secondary Education Majors in the Academic Learning Program

Elementary: Program of Typical Student

Fall	Winter	Spring	
TE 200C, Learning of School Subjects	TE 205C, Curriculum for Academic Learning TE 317C, Methods for Teaching Oral Language Competancies: Foundation for Reading and Writing TE 315C, Teaching Mathematics for Elementary Grades	TE 313, Critical Reading of Children's Literature TE 318C, Teaching Science in Elementary Grades TE 310C, Methods of Teaching Reading and Writing	JUNIOR YEAR
TE 306C, Interdisciplinary Elementary Curriculum TE 316C, Teaching Social Studies in Elementary Grades TE 311C, Practicum: Language Arts Across the Disciplines	TE 470C, Student Teaching	TE 450C, School and Society TE 406C, Interdisciplinary Inquiry	SENIOR YEAR

Secondary: Program of Typical Student

Fall	Winter	Spring	
TE 200C, Learning of School Subjects	TE 205C, Curriculum for Academic Learning	TE 412C, Reading in the Content Areas -OR- ENG 408A, Problems in Teaching Reading Secondary methods--one of the following: TE 326 (English) TE 334 (mathematics) TE 337 (science) or TE 338 (social studies)	JUNIOR YEAR
TE 470C, Student Teaching	TE 450C, School and Society TE 406C, Interdisciplinary Inquiry		SENIOR YEAR

Table 2
Academic Learning Program Field Assignments
1986-1988

Course	Field Assignment	Purpose of Field Assignment in terms of Program Themes	Primary Interpretive Lens
TE 200C, Learning of School Subjects (Fall Term, 1986)	Classroom observation and conversation with mentor teacher	-Shift perspective for analyzing the classroom from a student perspective to a teacher's perspective -Analyze mentor teacher's classroom in terms of classroom social context and approaches to teaching	Teaching
	Observe and talk to a student (2 visits)	-Observe and interpret a case of learning -Draw from theories of learning to analyze one student's understanding of particular subject matter	Learning
TE 205C, Curriculum for Academic Learning (Winter Term, 1987)	Enacted Curriculum: Observe mentor teaching a lesson in Academic Learning students' subject matter major	-Analyze structure of subject matter being taught (What are the concepts and how are they related?) -Analyze various representations of subject matter used during the lesson to promote student understanding of the subject matter	Subject Matter
	Text Analysis and Critique: Obtain mentor's textbook (in same subject area) and critique one chapter/ section	-Analyze the textbook from 3 perspectives: a) structure of the subject matter content b) functions of the subject matter content (What are the learning objectives, and why are they important for students to learn?) c) student development (How dies the text take student's prior knowledge and ways of learning into account?	Subject Matter and and Learning

Course	Field Assignment	Purpose of Field Assignment in terms of Program Themes	Primary Interpretive Lens
	Intended and Enacted Curriculum: Interview mentor about his/her planning of a lesson that will be observed. Observe the lesson (2 Visits)	-Analyze the lesson from the perspectives of structure and function of subject matter and student development	Subject Matter and Learning
		-Compare and explain differences between intended and enacted curriculum	Teaching
	Actual Curriculum: Observe 2 focal students in class, conduct clinical interviews with them about their understandings of concepts taught in observed lessons; collect sample work (2 visits)	-Analyze the subject matter and classroom teaching from the students' perspectives - What sense did they make of the lesson taught by the by the mentor? How can you explain their difficulties and successes?	Learning
		-Compare intended, enacted, and actual curriculum	Subject Matter, Learning, and Teaching
Secondary Majors: ENG 408A or TE 412C, Reading in the Content Areas and Respective Secondary Methods Classes Elementary Majors: TE 318C, Elementary Science Methods (Spring, 1987)	Plan a week-long unit in steps:	-Use concepts developed in Academic Learning courses toplan a unit of instruction	
	a) Essay and concept map analyzing structure and functions of the subject matter to be taught		a) Subject Matter
	b) Text analysis focusing on structure and functions of subject matter and student development		b) Subject Matter and Learning
	c) Preassessment of students' knowledge		c) Learning
	d) Central question or problem for the unit		d) Teaching, Subject Matter, and Learning
	e) Plans for activities and assessment		e) Teaching, Subject Matter, and Learning

Course	Field Assignment	Purpose of Field Assignment in terms of Program Themes	Primary Interpretive Lens
	Teach the unit	- Deepen understandings of program themes and link them with knowledge gained from classroom experience	Subject Matter, Teaching, and Learning
	Reflective Essay analyzing student learning, your planning and teaching		Subject Matter, Teaching, and Learning
	Weekly 1/2 day visits to mentor's classroom throughout the term	-Work on activities related to unit planning; learn from mentor about management strategiesand other aspects of school/classroom life	Subject Matter, Teaching, and Learning
Elementary Majors only: TE 306C, Interdisciplinary Curriculum	Observe first 3 days of school year	-Analyze mentor's management strategies and routines	Teaching
(Fall, 1987)	Plan and teach 2 lessons: 1) A lesson using aspects of reciprocal model to help students comprehend content area text 2) A lesson in which students do expository writing in a subject area	-Integrate reading and writing instruction with subject area teaching -Analyze student learning	Subject Matter and Teaching Learning
	Plan 2 units to be taught during student teaching including: a) central question/problem b) analysis of subject matter c) objectives/purposes d) sample activities and assessment e) 1-2 daily plans	- Use a conceptual change framework for planning units to be taught during student teaching	Subject Matter, Teaching, and Learning

Course	Field Assignment	Purpose of Field Assignment in terms of Program Themes	Primary Interpretive Lens
TE 316C, Social Studies Methods (Fall, 1987)	Plan a social studies unit to be used during student teaching, using similar format as described for TE 306C		Subject Matter, Teaching, and Learning
TE 470C, Student Teaching (Secondary majors) (Fall, 1987)	Develop at least 1 unit plan using simplified version of format used in TE 412C	Use a conceptual change framework for planning and teaching during student teaching	
TE 470C, Student Teaching (Elementary majors)	Develop unit plans for each chapter/chunk in Science, Social Studies, and Mathematics		
(Winter, 1988)	Midterm and End of Term Reflection Essays analyzing a unit you taught		

Table 3: Data Sources
MENTOR TEACHER PROJECT

DATA SOURCES	WHEN COLLECTED	FROM WHOM	RESEARCH QUESTIONS ADDRESSED*
Student Interviews	During first month in program End of each term in program (secondary = 5 terms) (elementary = 6 terms)	12 case study students	Primary focus on questions IA1, IB1, IC1, ID1
Mentor Interviews	End of each term student is in program (secondary = 5 terms) (elementary = 6 terms)	12 case study mentors	All
Faculty Interviews	End of each course taught End of each student teaching term	Course instructors and student teaching supervisors	All
Observations of the 2 foundations classes (TE 200C, Learning, and TE 205C, Curriculum)	Fall, 1986 Winter, 1987	All students Faculty teaching TE 200C, TE 205C	Primary focus on IA1, IB1, IC1, ID1 Also probed faculty's intended learnings

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*Codes for Research Questions:

I. Prospective Teachers' Learning:
  - A1 - Understanding of conceptual change/constructivist views of learning
  - A2 - Ability to use knowledge about learning during student teaching
  - B1 - Understanding of conceptual change teaching strategies and planning
  - B2 - Ability to use conceptual change frameworks in planning and teaching
  - C1 - Understanding of subject matter knowledge needed to teach
  - C2 - Ability to analyze and represent subject matter appropriately in planning and teaching
  - D1 - Understanding of the importance of reflection in learning to teach
  - D2 - Ability to reflect on planning and teaching during student teaching

II. Faculty/Mentor Teacher Collaboration

DATA SOURCES	WHEN COLLECTED	FROM WHOM	RESEARCH QUESTIONS ADDRESSED*
Questionnaires	Entry, End of First Year, End of Student Teaching	All Class of 88 students and their mentors	Student questionnaires focused on IA1, IB1, IC1, ID1 Mentor questionnaires probed all questions
Classroom observation and informal interviews in classroom setting or by phone	Fall 87-elementary Language Arts practicum and secondary student teaching Winter 1988-elementary student teaching	Case study students	Primary focus on IA2, IB2, IC2, ID2
Papers/Journals/Unit Plans written for courses	Each term prior to student teaching	Case study students	Primary focus on IA1, IB1, IC1, ID1
1 or 2 unit plans and reflective essays completed during student teaching	Fall 1987-secondary Winter 1988-elementary	All Class of 88 students (additional plans and daily plans collected from case study students)	Primary focus on IA2, IB2, IC2, ID2
Student teaching supervisors' notes about observations	Fall 1987-secondary Winter 1988-elementary	All Class of 88 students	IA2, IB2, IC2, ID2
Notes (and occasional tape recordings) of faculty/mentor meetings	2-3 meetings per term from Jan, 1987 through March, 1988	Mentors and Academic Learning faculty	Primary focus on II
Notes of faculty planning and debriefing meetings (before and after meetings with mentors)	In conjunction with each mentor meeting (2-3 mentor meetings/ term)	Academic Learning faculty and coordinators	Primary focus on II

Table 4: Exploring the Pedagogical Relationship Across the First Year
* Studied in Classroom Context through Field Visits

Experiences Designed to Explore Aspects of the Pedagogical Relationship	The Pedagogical Relationship: (A) Subject Matter Issues	(B) Teaching Issues	(C) Learning Issues
I. TE 200C: Learning of School Subjects -Lectures/discussion/reading -Journals -Writing assignments -Field visits/mentor teacher	What is the discipline? Knowledge growth in discipline What does a map of the discipline look like? What are important issues in each discipline? e.g. content/process debate in English *	What are the social relationships in the classroom - T/S role relations What approaches to teaching are used in this classroom? How does the teacher view subject matter? Shifting from student to teacher perspective in the classroom *	What am I like as a learner? (best/worst subject) What best helps me learn? How do students interpret task/subject matter in this classroom? What prior knowledge and experience does student have with this topic? What is the constructivist theory of the learner? *
II. TE 205C: Curriculum for Academic Learning -Lectures/discussion/reading -Journals -Writing assignments -Field visits/mentor teacher	What is the intended curriculum (structure, function) - main points about topic? Text critique - structure and function of knowledge How should knowledge be structured for individual differences? *	What is the structure and function intended curriculum and how does it compare with the enacted and actual curriculum? What representations are used to help student understand subject matter? What's the nature of the social interaction during the lesson? How do various assumprions about knowledge and students affect student's access to knowledge? *	What is the actual curriculum? How do two students understand the subject matter? What prior knowledge and understanding do students bring to situation? Text critique - what assumptions are made about student development? *
III. METHODS CLASSES English 408A/TE326 -Lecture/discussion/reading -Journals -Lesson planning -Field visits/mentor teacher	What is the "whole language" approach? What are strategies that facilitate this approach? Exploration of appropriate literature for use with adolescents *	Develop and teach plans using whole language approach strategies Classroom management techniques Cooperative learning strategies *	Teach a unit you have planned and assess student learning What prior knowledge/understanding do students have of the topic? *
-or- TE 412: Reading in the Content Areas -Lecture/discussion/reading -Journals -Lesson planning -Field visits/mentor teacher	How does reading comprehension relate to science, mathematics, social studies? Analyze structure and functions of subject matter in text chapter for unit plan *	How to develop and use reciprocal teaching strategies Plan and teach a unit using representations that manifest and structure and function as subject matter and build on students prior knowledge *	Teach a unit and assess student understanding Analyze student's prior knowledge and understanding of subject matter and reading strategies *

Table 5

Dave's Ideal Teacher

Fall Term		End of Winter Term		End of Spring Term
a teacher students want to have	SM	Knows subject matter and how to put it across to students	T-L	Actively involves students in their own learning
reputation in the school as a good teacher	L	Can "read" children well	T-L	Has students do lots of writing
kids would learn a lot	L-T	Knows the kinds of questions to ask to test for understanding	T-L	Has students explain their understandings
interesting				
	T	Is flexible and uses alternate methods	SM-T-L	Looks at content in ways that will involve students in interpreting info and drawing inferences, guided by teacher
respect each student	L	Is open - students aren't afraid to ask questions, say what they think		
present ideas clearly				
	R	Open to suggestions from other teachers; asks for help	T-L	Surfacing student conceptions a lot
Bill is the ideal teacher				
			T-L	Students involved in discussion, not just teacher talking
		Very caring about students		
		Bill is close to the ideal	T-L	Concrete to abstract
	T-L	Takes things slowly - aware of learning capabilities of students	SM-L	Chooses content based on real-life applications, something students can grasp
	T-L	Responds to student questions and student thinking - willing to alter plan		
			SM-L-T	Presents content in ways students can understand, not traditional ways
	L	Recognizes student misconceptions		
	SM	Lessons tie together content day-to-day and across units	SM-T	Relates concepts within and between units
	SM	Helps students make connections, see how things relate	L	Is in touch with student conceptions
			SM	Not just facts emphasis
	L	Students not afraid to be wrong		
			SM-T	Lots of representations of content (not like Bill)
	L	Puts responsibility on kids for their learning		
		Relaxed		
		Sense of humor		

Interpretive Lenses

L = learning
SM = subject matter
T = teaching
R - reflection in learning-to-teach

Table 6

GUIDELINES FOR HELPING STUDENTS

WORK TOWARD PROGRAM GOALS

Academic Learning Program

	Strong indications that students are linking Academic Learning goals with classroom teaching experiences:	Indications that students are not linking Academic Learning program goals with classroom teaching experience:
I. Working with People	A. Relations With Students The student teacher values, respects each student's thinking and actively elicits and considers students' thinking in planning and teaching.	The student teacher is impatient with students who don't "catch on" quickly and blames student learning difficulties on students' lack of effort.
	B. Relations With Mentors The student teacher initiates conversations with the mentor teacher about his/her teaching, asking for help in understanding the successes and failures of lessons.	The student teacher does not initiate conversations with the mentor (or other school personnel) about professional issues, or conversations are limited to "how to" without asking "why".
	C. Relations with 470C Instructor, Other Professionals	
II. Planning for Instruction	A. Comprehension of Student Understanding Seeks and uses information about students' prior knowledge in planning.	Focuses on content-to-be-covered without thinking much about students' prior knowledge and probable learning difficulties; Assumes coverage means learning.
	B. Transformation: Developing Tasks and Activities Selects tasks/activities/questions that will engage student thinking and develop student understanding of of central concepts/ideas - focuses on learning concerns.	Selects tasks/activities/questions because they will keep students orderly and busy, or the students will like them or because that's what comes next in the textbook - focuses on management concerns without serious consideration of learning issues.
	Builds on information about student understanding gained from such tasks for further planning.	Information from evaluation tasks is used mainly for grading purposes - it is not used to shape instruction.
III. Establishing Classroom Climate and Managing Instruction	A. Classroom Climate Teacher and students are actively engaged together in making sense of meaningful concepts and skills.	Teacher and students get along well and classroom is busy but students are satisfied to just get the tasks done, they ignore the content of instruction as much as possible.

	B. Time Management Prepares for classes effectively and efficiently, with an appropriate sense of priorities in deciding what needs to be done.	Spends too much time on some things and not enough on others, leading to inadequate preparation and disorganized classes.
	C. Classroom Organization Organizes and explains rules and procedures that enable classroom to run smoothly and efficiently.	Procedures and rules not adequately worked out or inconsistently enforced. Materials are sometimes not ready or planning incomplete.
	D. Dealing With Minor Disruptions Deals with minor disruptive behavior such as talking unappropriately in a fair and consistent way. Helps students understand rules and learn how to follow them.	Enforcement of rules too lax, inconsistent, or harsh and arbitrary. Fails to help students understand rules and learn to follow them.
	E. Dealing With Severe Behavior Problems Works with students who have severe behavioral or emotional problems in an organized and professional way. Helps them develop and follow through on reasonable plans to overcome their problems.	Falls in to unproductive patterns in dealing with problem students, such as nagging, open frustration, or inconsistent enforcement of rules.
	F. Communication About Content Teacher continually elicits and responds to students' ideas in order to shape and challenge student understanding. Teacher thinks about: How are students making sense of this? Why are they going astray?	Classroom interaction is primarily teacher to student: teacher lectures and asks evaluation questions (Do the students know this or not?)
IV. Command of Subject	A. Understanding Structure of Content Can identify central concepts and skills that are critical for students to understand for a given unit of instruction.	Takes an everything-you-could-possibly-know approach to content coverage - has a difficult time picking out key concepts.
	B. Understanding Functions of Content Understands the subject matter in such a way that applications to everyday/"real world" situations can be made. Can think of questions that will challenge students to apply concepts, skills, ideas to relevant situations.	Student has a fact or formula - oriented understanding of the subject matter. Cannot think up or even recognize good application questions. Cannot see alternate ways to organize subject matter besides the textbook organization.

V. Personal and Professional	A. Concern for Meaningful Learning Genuine concern for meaningful, conceptual learning by students is a goal that drives the student teacher's professional behavior.	The student teacher is conscientious about being prepared daily but focuses more on having something for the class to do than on what the students will learn.
	B. Reflection on Teaching The student teacher reflects carefully on his/her teaching and asks questions of other professionals to work on learning problems the students are having.	The student teacher is satisfied if things are pleasant and orderly and does not puzzle about learning failures of particular students.
	C. Analysis of Teaching The student teacher identifies areas he/she needs to learn more about in order to be an effective teacher and has made efforts to gain that knowledge (whether it be content knowledge, management skills, communication skills, etc.)	The student teacher responds to suggestions from the university observer about areas that he/she needs to learn more about, but does not seek such knowledge on his/her own.
	D. Receptivity to Feedback The student teacher welcomes feedback from mentor teacher and university observer as a learning opportunity.	The student teacher views feedback from the mentor or the university observer primarily as evaluative. ("Am I doing a good job or not?")

ow/4KRA-2tables

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Appendix A

Interview Protocols for Case Study Students

Mentor Teacher Project

Program Assessment Report

August, 1988

Mentor Teacher Project

Student Interview
Protocol #1

Fall, 1986

I. Questions about interpretations of current Academic Learning Courses/ assignments/activities.

A. Open questions

- Why did you choose the Academic Learning Program?
  In what ways di you expect it to be different from other programs?

- Describe one idea/issue that you've learned/discussed in TE200C so far that stands out for you.
  Why did this stand out for you?
  How has it changed your thinking about teaching/learning/learning to teach?
  Does it seem like something that can help you in learning to teach?
  Is this different from what you expected to learn? In what ways?

- Fenstermacher & Soltis talk about conceptions of the "educated person." Describe 2-3 ideas about your subject matter discipline that you would like the students you will have one day to learn. What do you think would make them "educated people" in this area? (What kinds of things are important in that field?)

B. Focused

Field Assignment:

- Tell me about the purpose of the first field assignment you did for TE200C.
- Describe what you did.
- What do you understand better about teaching/learning from doing that assignment?
- What did you learn from watching?
- What did you learn from talking to the mentor teacher?
- How did the things you read and/or discussed in 200C influence the way you observed? the questions your asked? (Have you observed classrooms before? What this experience different? Why?)
- What was your mentor teacher teaching about?
  How do you think students learn about that?
  What difficulties do you think they encountered in learning that?

Learning Theories:

- TE200C is called "Learning of School Subjects." You've been reading and discussing theories of learning. Describe one thing that has seemed particularly important to you that has come out of these readings/ discussions.
- Do you think this will be important to you as a classroom teacher? In what ways?
- Do you think it's important for you to learn and learning theories? Why If no - Why do you think instructors think it's important?
- Do you think there are more important things for you to learn about at this point? (Do you talk to your mentor teacher and anything related to learning theories?)

II. Questions about conceptions of teaching/learning to teach in general.

A. Open

- Why/how did you decide to become a teacher?
  - What rewards will there be for you in a teaching career?
- What is your image of an ideal teacher?
  - Where did that image come from?
- If you had the opportunity to teach in your mentor's classroom next week, in what areas/ways would you feel confident to do that and in what areas/ways would you feel a lack of confidence?
  - What do you know that you think you'll draw on?
- What are the kinds of things you need to learn in order to be an effective teacher?
  - How do you think you'll learn those things? If management - how does this relate to subject matter you'll be teaching?
- What aspects/parts of teaching do you think will be frustrating or difficult for you? How will you handle those?

B. Focused

- Imagine you're going to teach a unit of instruction in your teacher's classroom.
  - Describe how you would go about planning to teach that unit in your mentor teacher's classroom. What parts would there be in your planning (things to be considered)? (If they don't include ways of evaluating learning, ask: How would you evaluate student learning?)

- In 200C you've talked about 3 approaches to teaching - executive, therapist, liberationist.
  - What reactions do you have to those?
  - Do you feel yourself more comfortable with a particular approach to teaching?
  - Do you think it's useful to think about a general approach to teaching?

This questions was not asked - this issue was usually addressed during the discussion of the first field assignment.

- How often have you been in your mentor teacher's classroom?
  - What does your mentor teacher know how to do that you would like to learn?
  - How do you think you'll learn those things?

Open: Anything you would like to say, comment on, ask about regarding anything relating your experiences so far, about this study, about the Academic Learning Program, about teaching?

Mentor Teacher Project

STUDENT INTERVIEW #2

End of Learning Course

Dec, 1986

During the first interview I tried to get an understanding of students' entering notions about:

Learning - how children learn and what it means to have learned something

Teaching - what an ideal teacher is like (which roles are most important; how the teacher views the subject matter and the school curiculum, the students, learning, teaching); why the student chose teaching; what is involved in planning for instruction

Subject Matter - what is important in the student's subject matter major; what kids should learn about that discipline

Learning-to-teach - how the student thinks he/she will best learn to teach; what he/she needs to learn in order to be a teacher

In each of these categories, I am trying to figure out how the Academic Learning students' ideas are changing what the sources of influence on such change are (ie, mentor teachers, field tasks, course instructors, readings, experiences outside the program, etc.).

A major part of the first interview focused on early experiences in TE 200C and ways in which those first experiences had changed students' perceptions/ways of thinking about teaching and learning. In particular, I explored what students had learned from the first field assignment for TE 200C and from the content studied in the early part of the course. How did course content compare with what students think they need to learn in order to teach? Did students value professional study as a way of learning to teach or did they expect that classroom experience would play the larger role in learning to teach?

1. Views of the discipline/subject matter

It makes good common sense that to be a good teacher, you need to know your subject matter well. What does it mean to know (mathematics, science, English, social studies) well?

Probes: What does it mean to be good in ______?
What kinds of things should you know?
So how would you summarize the kinds of understandings of _______ an excellent teacher of the subject would need?
What do you mean?
Could you give an example?
What does x have to do with knowing (math, science, ss, Eng)?

Do you know someone who is not good in (math, Science, English, SS)? What is it about this person that makes him/her not good at x?

What courses in your major have you taken so far?

Do these courses help you know (English, math, science, ss) well? in the ways you need in order to be a good teacher?

What kinds of things do you need to learn about your subject matter to prepare you for teaching it?

Probes: Why?
Where do you think you will learn about that?

2. Planning and Teaching

Function of this question: In the context of a central teaching task, I hope to learn about the Academic Learning students' images of good teaching, their views of what is important in their subject area and why, and their ability to see the topic from student points of view.

I asked you to choose 2 topics in (science, math, social studies, English) that would be appropriate and important to teach as units of instruction in the to elementary/secondary curriculum. Let's start with the topic that you would feel comfortable dealing with during student teaching.

Tell me what topic you selected.______________________________________

Why did you select this topic?
    Is this something you understand really well?
    What makes you feel like you understand it really well?
        (Can you tell me more about that? How/where did you learn about it?)

What would be important to teach (elementary, middle school, high school) students about this topic? What would the essential content be? (What kinds of understandings would you want students to develop?)

Suppose you were going to plan a 2-week unit of instruction about this topic. Before you considered yourself ready to actually teach the unit, what things would you want to think through? (What things would you want to think about in planning the unit?)

What sources might you consult to help you in planning?

In what ways would a textbook be helpful/not so helpful to you in planning this unit?

What ideas do you have about how you might actually teach this topic?
    Probes: What teaching strategies would be important to use?
            How might you start out the unit?
            Why?

Suppose you were talking to a group of parents. How would you explain why you are teaching students this unit? (what the unit is all about and why it's important to teach?)
OR
If you were teaching this unit and a student said, "Why are we learning this," what would you say?

Do you think this is a topic that students will be interested in learning about? If students appear bored with the unit, what would you do?
    Probe: What is an example of something you could do that would
           get students more interested in this topic?

As you were teaching this unit, what would indicate to you that things were going well?

Is there anything about this topic that you think would be especially hard for students?

How would you know if students were understanding?

I also asked you to think about a topic that is appropriate and important to teach but that you would not feel very comfortable dealing with during student teaching.

What topic did you select?___________________________________

Why would you feel uncomfortable teaching about this topic?
What is it that you don't know about this topic?

3. Reflections of TE 200C

TE 200C was a course win which you studied many different concepts about teaching and learning and in which you had a number of different kinds of experiences. Think back over the ideas explored in that course and experiences you had in that course.

What things stand out for you?

Probes: Why does that stand out for you?
Where did that idea come from?
Is that important to you in learning to teach, in thinking about teaching?
Any other ideas?

TE 200C is called Learning of School Subjects. Describe any ways in which your experiences in the course changed how you think about kids' learning in schools?

4. Experiences so far in TE 205C

How would you describe to someone outside the program what TE 205C is about?

Probe: How do the readings so far fit into that course description?
How does what you've discussed in lecture or in groups fit into what the course is all about?
How do the field assignments fit into that course description?

What was the purpose of the first field assignment?

In carrying out this assignment, you were to take notes on events in the observed lesson and then analyze ways in which the content of the lesson was represented by the teacher. Was that a difficult task for you? WHy? What did you learn from doing that?

Was that a different way of thinking about subject matter than you're used to? How is it different?

5. Learning-to-teach from the mentor

How often have you been in your mentor teacher's classroom so far?

What have you learned from your mentor?

Is that important for you in learning to teach?

What kinds of things have you talked to your mentor about?
What kinds of questions do you ask your mentor?

What does you mentor know how to do that you would like to learn how to do?

How do you think you can learn to do that?

6. Other sources of influence on student thinking about teaching.

Have you had any experiences this Fall that we have not discussed that have helped you think about teaching/learning?

Did any of the courses you've taken this year help you think about teaching and/or learning in new ways?

7. Images of the ideal teacher

In the first interview, I asked you: What is your image of the ideal (math, science, ss, English) teacher? In your answer you talked about...(remind student of his/her response). Describe for me any ways in which your idea of the ideal teacher has changed since then.

Probes: Which of those characteristics would you say is most important? Has that changed since our last interview?
How would your ideal teacher view students? learning? the subject matter? the school curriculum?
What teaching strategies would be most important for your ideal teacher to use?

Since I last talked with your, have you come across any examples that match your image of the ideal teacher (in readings, discussions, in your MSU courses, in the schools)?

8. OPEN.

Any comments, questions on your experience in AL, about this study, about the ALP, about teaching

Mentor Teacher Project

STUDENT INTERVIEW #3

End of Curriculum Course

March, 1987

Learning - how children learn and what it means to have learned something in a given subject area

Teaching - what an ideal teacher is like (which roles are most important; how the teacher views the subject matter and the school curriculum, the students, learning, teaching); why the student wants to teach; what is involved in planning

Subject Matter - what is important in the A.L. student's subject matter major; what kids should learn about that discipline

Learning-to-teach - how the student thinks he/she will best learn to teach; what he/she needs to learn in order to be a teacher.

In each of these categories, I am trying to figure out how Academic Learning students' ideas are changing and what the sources of influence on such change are (ie, mentor teachers, field tasks, course instructors, readings, experiences outside the program, etc.).

In the second interview, I explored in the most depth a) issues related to subject matter understandings and what the prospective teachers think they need to learn about their subjects in order to teach effectively and b) prospective teachers' ideas about planning. We also talked about experiences in 200C, 205C, and other sources of influence on their thinking about teaching. Finally, I explored with them their notions about the "ideal teacher." This seemed to be a question that gets at some interesting things (like how A.L. courses influence their ways of thinking about teaching, the relative emphasis they put on subject matter knowledge, their ways of thinking about their mentors, etc.), and I would like to explore it in more depth in the third interview. I also want to focus more explicitly on the relationships between the field experiences and experiences in Academic Learning classes. I will try to get at the four categories of information listed above within the context of questions about their image of the ideal teacher and questions about TE 205C.

1. Images of the ideal teacher

I've asked you twice now about your image of an ideal teacher. Today I'd like you to think again about that ideal teacher - first describe what that teacher would be like.

Now I'd like you to give me a more specific picture of what an ideal teacher would be like. To do this, I'd like you to describe a typical lesson in the life of the ideal teacher. What does this ideal teacher think about and do? Think about a lesson that you observed during one of the assignments for TE 205C - how would your ideal teacher have thought about and taught that lesson?

What content would be emphasized?
What kinds of learning would be valued?
What kinds of questions would the teacher ask?

How does your description of the ideal lesson differ from the lesson as you observed it being taught? Why are those differences important to you?

(How does your ideal teacher think about students?)

(How does your ideal teacher view learning?)

* * How has your image of the ideal teacher been influenced by courses and experiences in the Academic Learning Program? Are you aware of changes in your thinking about this ideal teacher?

* How has your image of the ideal teacher been influenced by other sources?

What categories of knowledge do you need to know about to be this kind of teacher?

Here are some kinds of knowledge that you might think are needed in order to become the kind of ideal teacher you're describing. I'd like you to first sort these cards into those you think are needed/not needed to be your ideal teacher. Others you'd like to add?

Tell me what you think your ideal teacher needs to know about each category and why.

knowledge of structure of the discipline-

functions of the discipline-

how students learn-

facts to be learned

concepts to be learned

teaching strategies-

how to manage a classroom

how to control student behavior and get their cooperation

how to motivate students

other

I'd like you to order the cards in order from those you know the most about to those you know the least about.

How do you think you will learn about those you don't know about?

(Which of these have you learned something about so far from the Academic Learning Program? What have you learned?)

2. Experiences in TE 205C

How would you describe to someone outside this program what TE 205C is all about?

You had a number of different kinds of experiences in TE 205C, including lecture, subject matter groups discussions, field assignments, readings, etc. What things stand out for you from all of that as being important or interesting ideas?

What things stand out for you when I say "difficult" or "challenging?"

What things stand out for you when I say "confusing?"

Which subject matter groups did you attend? What stands out for you in each group?

Did you gain any new ideas or understandings related to your subject matter area as result of discussions in the subject matter groups in TE 205C?

Although TE 205C is called a curriculum course rather than a learning course (like 200C), did TE 205C help you to think about student learning in any significant ways? new ways?

3. Field assignments for TE 205C

Last time we talked a bit about the first field assignment for TE 205C in which you observed the lesson , focusing on the enacted curriculum . Today I'd like to talk about assignments 3 and 4, in which you studied and compared the intended, enacted and actual curriculum.

How would you describe the purposes of those two assignments?

Describe your visits - what you did, what you observed.

What do you understand better about teaching from doing those assignments?

What do you understand better about learning from doing those assignments?

What do you understand better about the school curriculum from doing those assignments?

Did things you talked about or read about for TE 205C influence how you interpreted what you observed? In what ways?

How were the interactions you had with your mentor this term different or the same as interactions you had last term?

Did you visit your mentor's classroom for visits other than those required for TE 205C? Describe any such visits.

* What things did you learn from your field visits that were perhaps not intended by your TE 205C instructors?

4. Sources of influence

Are there ideas you've been taught about in A.L. classes that you think are unrealistic for use in "real" classrooms? Why?

I'm wondering about the relative importance for you of field experiences and experiences in A.L. classes in hlping you learn to teach. On this scale from 1 to 5, how would you rate the contributions that each has made to your thinking and learning about teaching.

1 very little	2	3	4	5 a great deal	Contributions of experiences in Academic Learning classes
1 very little	2	3	4	5 a great deal	Contributions of assigned field assignments
1 very little	2	3	4	5 a great deal	Contributions of field experiences not required for Academic Learning classes

Explain your choices.

5. Elementary majors -

In addition to TE 205C, you also took two other Academic Learning courses this term - Oral Language Methods and Math Methods. What stands out for you about each of those courses?

Oral language -

Math methods -

THere was no field work associated with either of those courses. Would fieldwork have helped you understand course ideas better? In what ways?

Optional.

6. You will be doing some actual teaching next term. In what ways do you feel well prepared to do that?

In what ways do you feel unprepared to do that?

What do you expect to learn from your A.L. courses this Spring?

If you could design a field assignment for yourself right now, what would it be like?

8. Open - any comments, questions.

Mentor Teacher Project

STUDENT INTERVIEW #4

May-June, 1987

End of Spring Methods Classes

1. Do you feel that you have made significant progress toward becoming a teacher since the last interview? Explain.

   -Are there particular experiences in the Academic Learning Program that helped you progress?

2. Think back to your intentions for a teaching career before you began the program. Have your career plans and goals changed in any ways since that time?

   Are you feeling any more or less committed to a teaching career?
   Do you have different goals for yourself as a teacher than you did before?
   If there is any change in plans, what is the source of influence on that change? Why the change?

3. The ideal teacher. You have been asked in each interview about your image of the ideal teacher. First I'd like you to describe for me what that teacher would be like.

How does your ideal teacher think about the content of instruction?

How does your ideal teacher think about students?

How does your ideal teacher think about learning?

How kinds of teaching strategies are particularly important to your ideal teacher? Are these subject matter specific?

Are you aware of any changes in your thinking about the ideal teacher as a result of experiences in the Academic Learning Program this term? Explain.

Has your image of the ideal teacher been influenced by other sources?

4. Program themes and emphases and their links in the field.

You have now taken the following courses in the Academic Learning Program:

Elementary

- TE 200C, Learning
- TE 205C, Curriculum
- Math Methods
- Oral Language
- Science Methods
- Reading and Writing Methods

Secondary

- TE 200C, Learning
- TE 205C, Curriculum
- A methods course
- TE 412C, Reading in the Content Areas OR
- ENG 408A, Problems in the Teaching of Reading

Describe ways in which you see the Academic Learning courses as sharing common themes, common emphases. (What are the key ideas that seem to be emphasized in each course? What makes the courses seem to fit together, build on each other?)

Do any of the courses seem not to belong or to fit with program themes? Explain.

5. One of the themes emphasized in the ALP is the importance of teaching for conceptual change or for meaningful conceptual development. Describe how you would explain this emphasis to a friend or relative not in the program. (What does it mean to teach for conceptual change?)

Do you think that the unit you taught this term was focused on helping students through a process of conceptual change? Why or why not? In what ways?

6. In what ways does your mentor teacher support you in working toward goals and ideas emphasized in Academic Learning courses? Specific examples of such support would be helpful.

(Probes if student has difficulty answering this one: Does your teacher model the kinds of teaching strategies being emphasized? Does your teacher show interest in what you are learining in your courses? Does your teacher encourage you to try things emphasized in courses?)

Are there any ways in which your mentor teacher does not support you or encourage you in working toward program goals?

-Give examples.
(I'm trying to get at any conflicts the student may feel between what the mentor says and what the program says.)

7. Are any of the ideas/teaching strategies/themes you have been taught about in Academic Learning courses unrealistic for classroom use? Explain.

8. Interactions With Mentor Teacher. Were your interactions with your mentor teacher different this term? In what ways? Describe ways in which you interacted with your mentor this term.

What things did you learn from your mentor that were not necessarily intended by AL course instructors (things not related to course assignments and course goals)?

9. Unit planning and teaching. You just finished teaching a unit in your mentor's classroom.

-What was difficult or easy about planning the unit?

If the student does not mention anything about the subject matter itself, ask:

What was the topic of your unit? Did you need to develop any understandings of the topic itself before teaching the unit?

Are there things you wish you knew more about related to this topic?

-What was difficult or easy about teaching the unit?

-What was difficult or easy about evaluating student learning in the unit?

Describe what you wanted students to understand from this unit. Why do you think these are important ideas for the students to learn about?

10. OPTIONAL - probably won't be time for this one.
Describe ways in which your mentor teacher and course instructors contributed to your learning this term about -

planning

the subject matter to be taught -

teaching strategies -

assessing student learning -

classroom management strategies -

11. Considering all the different components of your methods class (science methods for elementary students), what things stand out for you as being particularly important or interesting ideas or experiences in helping you learn to teach?

What things stand out for you as being confusing or problematic in any way?

12. SECONDARY ONLY. How would you describe what TE 412C/ENG 408A is about? (What were the goals of the course?)

Considering all the different components of TE 412/ENG 408A (including weekly field visits, unit teaching, readings, lecture, discussion groups), what things stand out for you as being particularly important or interesting ideas or experiences in helping you learn to teach?

What things stand out for you as being confusing or problematic in any way?

Describe any ways in which TE 412C helped you think about student learning in any new ways.

13. What ideas still stand out for you from TE 200C?
Do the ideas discussed in that course strike you any differently now than they did when you were actually taking the course?
Why do you think those things are still with you?

14. What ideas still stand out for you from TE 205C?
Do the ideas discussed in that course strike you any differently now than they did when you were actually taking the course?
Why do you think those things are still with you?

(Optional) 15. On this scale from 1 to 5, how would you rate the relative contributions that field experiences this term and Academic Learning courses taken this term have made to your thinking and learning about teaching?

1 2 3 4 5 very little a great deal	Contributions of experiences in Academic Learning classes this term
1 2 3 4 5 very little a great deal	Contributions of field assignments (including weekly field visits for secondary students)

Explain your choices.

(Optional) 16. SECONDARY STUDENTS. In the last interview you were asked about the different kinds of knowledge it takes to become the ideal teacher. As you look ahead to student teaching next term, in what areas do you feel well prepared for student teaching? In what areas do you feel unprepared?

(Probes - subject matter knowledge including knowledge of structure and functions of the discipline, knowledge about students and their learning, knowledge of teaching strategies, classroom management techniques, motivation, discipline).

Optional ELEMENTARY STUDENTS. Suppose you were scheduled to student teach in the Fall. In what areas would you feel well prepared to teach?

What do you hope to learn during Fall term that will better prepare you for student teaching?

17. Open. Any comments, questions, concerns, complaints about any of the study, or about ALP in general, about teaching?

Mentor Teacher Project

STUDENT INTERVIEW #5

Elementary

November-December, 1987

During Language Arts Practicum

1. Do you think that you have made significant progress toward becoming a teacher since your last interview in June? Explain.

   -Are there particular experiences in the Academic Learning Program that helped you make progress?

2. Think back to your intentions for a teaching career and how they have changed or remained the same since you began the program last year. Have your career plans and goals changed in any ways since last year?

   --Are you feeling any more or less committed to a teaching career?
   --Do you have different goals for yourself as a teacher than you did before?
   --If there is any change in plans, what is the source of influence on that change? Why the change?

3. The ideal teacher. You have been asked about your image of the ideal teacher in each interview. Describe your image of the ideal teacher today.

How does your ideal teacher think about (pick student's subject matter major)?

How does your ideal teacher think about students?

How does your ideal teacher think about learning?

What kinds of teaching strategies are particularly important to your ideal teacher in (student's major)? In other subject areas?

Are you aware of any changes in your thinking about the ideal teacher since last year?

Are any of those changes the result of experiences in the Academic Learning Program?

Has your image of the ideal teacher been influenced by other sources?

4. Language Arts Practicum.

What stands out as important learnings?

What stands out as difficult, challenging?

What stands out as confusing, problematic?

5. Interdisciplinary Curriculum.

What stands out as importnat learnings?

What stands out as difficult, challenging?

What stands out as confusing, problematic?

6. Social Studies Methods.

What stands out as important learnings?

What stands out as difficult, challenging?

What stands out as confusing, problematic?

7. How do themes/ideas developed in any or all of the three courses you took this term relate to themes/issues that were discussed in last year's courses?

--Do the courses seem to build on one another, address common themes or emphases?

8. One of the themes emphasized in the ALP is the importance of teaching for conceptual change or for meaningful conceptual development. Have your courses this term helped you understand that program theme in any new ways?

--How would you describe conceptual change teaching to someone outside the program?

9. Experiences in the field this term.

Describe the kinds of experiences you had in the field this term.

What did you learn from these experiences about teaching?

about learning?

about the language arts curriculum?

What did your mentor help you learn from this field experience?

What did any of your course instructors help you learn from this field experience?

10. Mentor Teacher Role.

In what ways does your mentor teacher suppport you in working toward ALP goals/ ideas emphasized in AL classes? Specific examples.

Do you ever thinnk you are receiving conflicting messages from your mentor and from program instructors? Examples.

Describe the nature and frequency of interactions you have had with your mentor this term.

11. Academic Learning Faculty.

How have program course instructors and field instructors helped you think about your work in the field this term?

12. Preparation for student teaching.

Subject matter preparation - In which subject area do you feel weakest? What kinds of knowledge are missing that you feel you need? In what subject area do you feel strongest? What kinds of knowledge do you have about this area that makes you feel so well prepared?

Planning - How do you think you will approach planning during student teaching (what thaings will you consider in planning)? How does that differ from your mentor's planning? Why do you intend to plan in these ways?

Speculate about ways in which you feel ready to student teach. What prepared you?

What do you think will be difficult for you during student teaching? Why? (Will planning be difficult? classroom management? assessing student learning?)

13. Relative contributions of field vs. coursework.

Rate the relative contributions that field experiences this term and Academic Learning courses taken this term have made to your thinking and learning about teaching.

1 very little	2	3	4 a great deal	5	Contributions of experiences in Academic Learning courses this term
1 very little	2	3	4 a great deal	5	Contributions of field assignments in Language Arts Practicum
1 very little	2	3	4 a great deal	5	Contributions of field assignments in Interdisciplinary Curriculum

Explain your choices.

14. Are there any ideas or teaching strategies that you have learned about in AL courses that seem unrealistic to you in real classrooms?

15. Program Changes?

If you could change one thing about the Academic Learning Program that would have been a big help to you in learning to teach, what would you change?

16. OPEN.

STUDENT INTERVIEW PROTOCOL #5
SECONDARY

November, 1987
During Student Teaching

Purposes of this Interview:

This interview is taking place during the student teaching term (a little past midterm). The people observing the case study students have collected evidence that some student teachers clearly reflect program goals in their teaching behavior, while other students appear not to be linking program goals with their daily teaching behaviors. The purpose of this interview is to get students' perceptions about the relationship between program goals and their daily teaching. Are students doing a lot of thinking about program goals (even in cases where they cannot implement the goals in ways we would recognize)? If they are not thinking about program goals, what *is* guiding their teaching practice? Why? In order to understand *why* students are or are not actively linking program goals and daily teaching experience, it is critical to understand more fully the roles of the mentor teacher and and the student teaching observer. This interview will probe students' perceptions of those persons as sources of knowledge in learning to teach.

The interview starts with fairly open-ended questions that do not necessarily point students toward talking about Academic Learning goals. We want to see if students are viewing student teaching as a learning experience and what kinds of things the student teachers think good teachers need to know.

1. Describe the most important things you have learned so far this term from the student teaching experience. Probe to get explanations about how the student learned these things.

2. Describe things that you find difficult about teaching.

3. Describe your areas of strength as a teacher.

4. Describe your areas of weakness as a teacher.

6. Do you feel that you have the kinds of subject matter knowledge needed to teach your load this term successfully? What kinds of subject matter knowledge do you need to have to teach x successfully? In cases where you do not feel like you have the necessary subject matter knowledge, what do you do?

7. How does learning to teach in this setting differ from last year's experiences in Academic Learning? How is it similar?

*****What things that were talked about in AL classes last year do you find yourself thinking about this term?

Images of the Ideal Teacher. This is a series of questions that the students have been asked in each interview.

In each interview, I have asked you to describe your image of the ideal teacher. How would you describe the ideal (Subject matter area) teacher today?

**If not mentioned, ask about this ideal teacher's way of viewing the subject matter to be taught, student learning, favored teaching strategies.

In what ways has the student teaching experience changed your image of the ideal teacher? Explain.

Has this image been influenced by other experiences in the Academic Learning Program? In what ways?

Has this image been influenced by experiences outside the Academic Learning Program? Describe.

OPTIONAL.

What kinds of knowledge does it take to be this kind of teacher? (probe for subject matter knowledge, knowledge about students and learning, knowledge about teaching strategies, management, etc.)

Interactions with mentor, student teaching observer.

Last year you had a number of different sources to draw from in helping you learn to teach, including Academic Learning course instructors, readings, lectures, field visits and interactions with mentors, written assignments and feedback on those, group discussions in AL courses, unit planning, etc.

This term, what are the most important sources of support in helping you learn to teach (support can be other people, books you are reading, your own reflection on your teaching, etc.)?

IF not mentioned, ask about each of the following potential sources:

What role does your mentor teacher play this term?

In what ways does your mentor help you learn to teach? Describe the ways you typically interact with your mentor.

Does your mentor watch you teach and give you feedback about these observations? Is this useful for you? In what ways?

Are there any ways in which your mentor is not helpful or could be more helpful in this learning-to-teach process?

One of the goals of the Mentor Teacher field component in the ALP is that mentors will actively support students in rethinking themes, issues, strategies taught in AL classes in light of classroom reality. Thus, the mentor would help students link their study in AL classes with classroom realities. Does your mentor do that? Can you give an example?

What role(s) does your student teaching observer play this term?

In what ways does your observer help you learn to teach? Describe the ways you typically interact with your observer.

Are the observer's observations and feedback on your teaching useful to you? In what ways?

What do you do with the advice, suggestions given to you by your observer? Do you always agree with the advice?

Are there any ways in which your observer is not helpful or could be more helpful in the learning-to-teach process?

Do you ever feel like you are receiving conflicting messages from your observer and from your mentor teacher?

What role (s) do the student teaching seminars play this term?
In what ways are they helpful or not so helpful in the learning-to-teach process?

What role(s) do previous Academic Learning courses and field experiences play in the learning-to-teach process?

What role(s) does your own reflection on your teaching play in helping you learn to teach?

Unit Plan Requirement

In the context of a specific student teaching requirement, we will try to find out more about the nature of mentor-student, observer-student interactions and about how the student thinks about program goals (or not) in planning, teaching, and reflecting on teaching.

As a student teaching requirement you are developing and teaching one unit plan. Describe how you went about planning and teaching that unit.

(Probe about why the topic was selected, what kinds of understandings are intended from the unit and why those are worthwhile learnings, what things the student thought about in planning the unit, what sources the student used in planning the unit, whether the student thought about potential learner difficulties or misconceptions, how learning is to be assessed).

Probe for mentor and observer roles in planning the unit.

Are you teaching the unit now? If student has taught or is teaching the unit now, ask:

Is the unit going well? In what ways?

Have you noticed any difficulties with students' conceptual change?

Was the unit planning process different from the other units you are teaching? In what ways? In what ways is that process similar to what you do on a daily basis? What will your unit planning look like when you are out on your own?

Suppose the x school district school board wanted to review its y curriculum. They asked for advice from their teachers about what kinds of changes they would recommend in the curriculum. What kinds of changes would you recommend? Why?

Importance of study vs. experience in learning to teach

Are there ideas/strategies you were taught about in AL classes that you think are unrealistic for use in "real" classrooms? Explain.

I'm wondering about the relative importance for you of experiences in AL classes, field experiences prior to student teaching, and student teaching in helping you learn to teach. On this scale from 1 to 5, how would you rate the contributions that each has made to your thinking and learning about teaching.

1	2	3	4	5	
very little				a great deal	Contributions of experiences in Academic Learning classes

1	2	3	4	5	
very little				a great deal	Contributions of pre-student teaching field experiences

1	2	3	4	5	
very little				a great deal	Contributions of student teaching

Explain your choices.

If you could redesign the student teaching experience, what would you recommend to maximize your learning-to-teach?

OPTIONAL - save for Winter term interview?
In a job interview situation, you may be asked to describe your personal philosophy about teaching and learning. What are your current ideas about how you might answer such a question?

STUDENT INTERVIEW PROTOCOL #6
ELEMENTARY

March, 1988
End of Student Teaching

Purposes of this Interview:

This interview is taking place at the end of the student teaching term (a little past midterm). The people observing the case study students have collected evidence that some student teachers clearly reflect program goals in their teaching behavior, while other students appear not to be linking program goals with their daily teaching behaviors. The purpose of this interview is to get students' perceptions about the relationship between program goals and their daily teaching. Are students doing a lot of thinking about program goals (even in cases where they cannot implement the goals in ways we would recognize)? If they are not thinking about program goals, what is guiding their teaching practice? Why? In order to understand why students are or are not actively linking program goals and daily teaching experience, it is critical to understand more fully the roles of the mentor teacher and the student teaching observer. This interview will probe students' perceptions of those persons as sources of knowledge in learning to teach.

The interview starts with fairly open-ended questions that do not necessarily point students toward talking about Academic Learning goals. We want to see if students are viewing student teaching as a learning experience and what kinds of things the student teachers think good teachers need to know.

1. Describe the most important things you have learned so far this term from the student teaching experience. Probe to get explanations about how the student learned these things.

2. Describe things that you find difficult about teaching.

3. Describe your areas of strength as a teacher.

4. Describe your areas of weakness as a teacher.

5. What things that were talked about in AL classes last year and last term do you find yourself thinking about this term? How were those important to you during student teaching?

6. Do you feel that you have the kinds of subject matter knowledge needed to teach your load this term successfully? What kinds of subject matter knowledge do you need to have to teach x successfully? In cases where you do not feel like you have the necessary subject matter knowledge, what do you do?

7. How does learning to teach in this setting differ from last year's experiences in Academic Learning? How is it similar?

8. Images of the Ideal Teacher. This is a series of questions that the students have been asked in each interview.

In each interview, I have asked you to describe your image of the ideal teacher. How would you describe the ideal (Subject matter area) teacher today?

**If not mentioned, ask about this ideal teacher's way of viewing the subject matter to be taught, student learning, favored teaching strategies, process of learning to teach.

In what ways has the student teaching experience changed your image of the ideal teacher? Explain.

Has this image been influenced by other experiences in the Academic Learning Program? In what ways?

Has this image been influenced by experiences outside the Academic Learning Program? Describe.

OPTIONAL.
What kinds of knowledge does it take to be this kind of teacher? (probe for subject matter knowledge, knowledge about students and learning, knowledge about teaching strategies, management, etc.)

9. Planning

In the context of specific student teaching requirements regarding unit and daily planning, we will try to find out more about the nature of mentor-student, observer-student interactions and about how the student thinks about program goals (or not) in planning, teaching, and reflecting on teaching.

Describe how you will go about planning when you're out on your own teaching.

In what ways will your planning be different or the same as planning you were required to do during student teaching?

(Probe for thinking about both daily and unit planning relative valuing of each, approaches to each.)

During student teaching you were required to develop unit plans in each subject area. In what ways was that helpful/not so helpful in learning to teach?

Look at this list of pieces of the unit planning requirement. Tell about the function of each of the plan. Which pieces do you find important and why?

Central question
list of concepts
(definitions of concepts)
objectives
sample assessment questions
students' prior knowledge/misconceptions

Probe for mentor and observer roles in unit planning process.

10. Interactions with mentor, student teaching 470C instructor.

Last year you had a number of different sources to draw from in helping you learn to teach, including Academic Learning course instructors, readings, lectures, field visits and interactions with mentors, written assignments and feedback on those, group discussions in AL courses, unit planning, etc.

This term, what are the most important sources of support in helping you learn to teach (support can be other people, books you are reading, your own reflection on your teaching, etc.)?

If not mentioned, ask about each of the following potential sources:

a. What role does your mentor teacher play this term?

In what ways does your mentor help you learn to teach? Describe the ways you typically interact with your mentor.

Does your mentor watch you teach and give you feedback about these observations? Is this useful for you? In what ways?

Are there any ways in which your mentor is not helpful or could be more helpful in this learning-to-teach process?

**One of the goals of the Mentor Teacher field component in the ALP is that mentors will actively support students in rethinking themes, issues, strategies taught in AL classes in light of classroom reality. Thus, the mentor would help students link their study in AL classes with classroom realities. Does your mentor do that? Can you give an example?

b. What role(s) does your 470C instructor play this term? In what ways is the 470C instructor role the same or different from the mentor teacher role?

In what ways does your observer help you learn to teach?
Describe the ways you typically interact with your 470C instructor.

Are the 470C instructor's observations and feedback on your teaching useful to you? In what ways?

What do you do with the advice, suggestions given to you by your 470C instructor? Do you always agree with the advice?

Are there any ways in which your observer is not helpful or could be more helpful in the learning-to-teach process?

What program themes or ideas from Academic Learning courses has your 470C instructor emphasized and helped you work on?

Do you ever feel like you are receiving conflicting messages from your observer and from your mentor teacher?

c. What role (s) do the student teaching seminars play this term? In what ways are they helpful or not so helpful in the learning-to-teach process?

What role(s) do previous Academic Learning courses and field experiences play in the learning-to-teach process?

What role(s) does your own reflection on your teaching play in helping you learn to teach?

11. Importance of study vs. experience in learning to teach

Are there ideas/strategies you were taught about in AL classes that you think are unrealistic for use in "real" classrooms? Explain.

I'm wondering about the relative importance for you of experiences in AL classes, field experiences prior to student teaching, and student teaching in helping you learn to teach. On this scale from 1 to 5, how would you rate the contributions that each has made to your thinking and learning about teaching.

1 2 3 4 5 Contributions of experiences
very little a great deal in Academic Learning classes

1 2 3 4 5 Contributions of pre-student
very little a great deal teaching field experiences

1 2 3 4 5 Contributions of student
very little a great deal teaching

Explain your choices.

If you could redesign the student teaching experience, what would you recommend to maximize your learning-to-teach?

OPTIONAL - save for Winter term interview?
In a job interview situation, you may be asked to describe your personal philosophy about teaching and learning. What are your current ideas about how you might answer such a question?

ow/5mtp-2

STUDENT INTERVIEW PROTOCOL #6

SECONDARY

Spring, 1988

After Completion of all Program Courses

This interview is being conducted well after the secondary prospective teachers' completion of student teaching and after their last two courses in the Academic Learning Program (TE 406C, Interdisciplinary Curriculum and TE 450C, School and Society). The interview is designed to probe the extent to which the following program themes are a part of the prospective teachers' personal ways of thinking about teaching:

- a constructivist view of the learner,
- the need for rich, conceptually-integrated subject matter understandings (nature of inquiry and knowledge growth in the disciplines, structure and functions of the subject matter, relationship of the subject matter to student development),
- effective teaching strategies and student tasks for conceptual change teaching,
- learning-to-teach as an ongoing, reflective process.

These issues are explored through two main questions:

1) an open-ended task in which students are asked to analyze a piece of a textbook (or other curriculum materials) and talk about how they would think about this piece (a chapter, for example) in preparing to teach it. We will use a textbook the student used during student teaching, but select a chapter not addressed during student teaching,

2) the prospective teachers' views of the ideal teacher and the ideal teaching situation.

In addition, depending on time available, we would like to include questions that

a) are designed to explore particular issues with a given student,

b) find out about the influence of the last two courses in the program, particularly how students think about issues raised in 450C about the social context of teaching and learning,

c) probe the students' retrospective look at program experiences (especially the field experiences and mentor teacher role).

1. The student will be given a textbook chapter either a day ahead of time or for 10-15 minutes at the beginning of the interview. They will be asked to look at the chapter with the following question in mind:

   This is a chapter you did not teach during student teaching. Suppose next year you are faced with teaching this chapter. What would you think about in using this chapter? (How would you use this chapter in preparing to teach?)

   Probes: Would you seek further information? What kinds? If no response from the student regarding structure, function, student development, representations, central focus/question, we could ask:

   Why is this content important to teach? Would you think about organizing the content any differently?

2. The Ideal Teacher

How would you describe the ideal (science, math, English, Social Studies) teacher today?

If not mentioned, ask about the ideal teacher's way of viewing:

a) student learning -

b) subject matter -

What kinds of subject matter understanding does the ideal teacher have?

How would the ideal teacher think about what content to emphasize or exclude?

What kind of (math, science, English, Social Studies) curriculum the ideal teacher would favor?

c) teaching strategies and student tasks favored by the ideal teacher

d) the kind of classroom environment the ideal teacher would create (nature of teacher-student interactions, classroom management, student vs. teacher responsibilities, etc.)

What's the teacher's/student's role in the learning process?

*In what ways are you aware that your image of the ideal teacher has changed:

a) Since the completion of student teaching? Why?

Have TE 406C and/or TE 450C influenced your ways of thinking about the ideal teacher (or about your own student teaching experience)? Explain.

b) Since beginning the Academic Learning Program? Why?

*Describe one unit of your student teaching in which you think you came closest to being this ideal teacher. In what ways did you achieve some of your ideals? You may want to contrast your success in this unit with a unit in which you felt less ideal. What were the differences?

Probe to get picture of extent to which student perceives his/her attainment of program ideals.

(Optional) As you think about looking for a teaching position, what would your ideal teaching job be like? How will you approach your daily teaching in this job?

3. Questions Particular to the student

4. Retrospective look at Academic Learning experiences

   a. In Academic Learning, there are a number of themes or issues that are integrated into the program sequence. What are two program themes that were important to you in learning to teach?

   b. Did TE 406C and/or TE 450C help you think about and further develop those themes? In what ways? (OR: In what ways did TE 406C and TE 450C contribute to your understanding of conceptual change teaching?)

   c. Are there other important ideas/issues that these 2 courses raised for you?

d. Looking back over your 2 years in the Academic Learning Program, what ideas and/or experiences were particularly important to you in learning to teach? In what ways were they important?

Ideas:

Experiences:
(remind student of particular field experiences and courses, interactions with mentor, if these are not mentioned).

What important experiences were left out?

(Optional) Suppose you had started teaching without any of the teacher education experiences you've had. Do you think you would have been a different kind of teacher than you see your self today? In what ways? Why?

STUDENT INTERVIEW PROTOCOL #7

ELEMENTARY

June, 1988

After Completion of all Program Courses

This interview is being conducted well after the elementary prospective teachers' completion of student teaching and after their last two courses in the Academic Learning Program (TE 406C, Interdisciplinary Inquiry, and TE 450C, School and Society). The interview is designed to probe the extent to which the following program themes are a part of the prospective teachers' personal ways of thinking about teaching:

- a constructivist view of the learner,

- the need for rich, conceptually-integrated subject matter understandings (nature of inquiry and knowledge growth in the disciplines, structure and functions of the subject matter, relationship of the subject matter to student development),

- effective teaching strategies and student tasks for conceptual change teaching,

- learning-to-teach as an ongoing, reflective process.

These issues are explored through the following questions:

1) a set of structured tasks in which students are asked to analyze pieces of mathematics and science textbooks and to talk about how they would think about these pieces in preparing to teach.

2) the prospective teachers' views of the ideal teacher and the ideal curriculum in each of the subject areas.

In addition, depending on time available, questions will be asked that

a) are designed to explore particular issues with a given student,

b) probe the influence of the last two courses in the program, particularly how students see these courses as relating to program themes and how students think about issues riased in 450C about the social context of teaching and learning,

c) probe the students' retrospective look at program experiences (particularly the field experiences and the mentor teacher role).

1. Planning and Teaching Mathematics

[We are interested in seeing the extent to which students analyze materials from structure, function, and student development perspectives without our stimulus to do so. Do the Academic Learning students talk about the conceptual organization of the content? Do they think about why this content is important for students to learn and link it to students' experiences? Do they think about the kinds of difficulties students are likely to have with the content and reasons for those difficulties?]

I would like you to look at this section from a second grade math textbook.

Did you teach this during student teaching? (Listen for what the prospective teacher considers the "this" to be -- e.g., subtraction, "borrowing," lining up numbers in columns. Don't impose "subtraction with regrouping.")

Can you describe how you would approach this if you were teaching second grade?

Probes: Why would you do that?
How did you come up with this idea/approach?
What do you mean by ______?
Can you give me an example of what you mean?

How would you tell if students were "getting" it?

Can you give an example of a sample test question you might ask to assess whether kids were "getting" it?

What would be clues to you that students were not "getting" it?

2. Planning and Teaching Science

[Again, we are trying to see the extent to which the prospective teachers analyze materials from structure, function, and student development perspectives without our stimulus to do so. We do not want to use the word "unit" in asking these questions.]

This is a set of chapter review questions from a fifth grade science textbook. Take a few minutes to read it (note that the answers are provided in the margins).

What do you think about this chapter review? I'm interested in your impressions of it (Do you think it's a good a review? Why or why not?)

Suppose you were going to be using this chapter in working with fifth grade students. How would you approach it? [Let student look at the text chapter for a few minutes.]

Probes: Why would you do that?
How did you come up with that idea?

How would you know if students were "getting" what you wanted them to?

Can you give an example of a sample test question you might use to assess whether students were "getting" it?

What would be clues to you that students were not "getting" it?

3. The Ideal Teacher

How would you describe the ideal teacher today?

If not mentioned, ask about the ideal teacher's way of viewing:

a) student learning -

b) subject matter -

What kinds of subject matter knowledge does the ideal teacher have?

How would the ideal teacher think about what content to emphasize or exclude (the ideal curriculum) in:

-Language Arts

-Social Studies

-Mathematics

-Science

c) teaching strategies and student tasks favoraed by the ideal teacher

d) the kind of classroom environment the ideal teacher would create (nature of teacher-student interactions, classroom management, student vs. teacher responsibilities, etc.)

What is the teacher's/student's role in the learning process?

In what ways are you aware that your image of the ideal teacher has changed:

a) Since the completion of student teaching? Why?

Have your experiences in TE 406C and/or TE 450C influenced your ways of thinking about the ideal teacher (or about your own student teaching experience)? Explain.

b) Since beginning the Academic Learning Program? Why?

Describe one unit of your student teaching in which you think you came closest to being this ideal teacher. In what ways did you achieve some of your ideals? You may want to contrast your success in this unit with a unit in which you felt less ideal. What were the differences?

Prove to get a picture of the extent to which the student perceives his/her attainment of program ideals.

What kinds of knowledge do you need to develop before you will be the ideal teacher?

4. Any questions particular to the student

5. Retrospective look at Academic Learning experiences

a) In Academic Learning, there are a number of themes or issues that are integrated into the program sequence. What are two program themes that were important to you in learning to teach?

b) Did TE 406C and/or TE 450C help you think about and further develop thoses themes? In what ways?
(OR: In what ways did TE 406C and TE 450C contribute to your understanding of conceptual change teaching?)

c) Are there other ideas/issues that these 2 courses raised for you?

d) Looking back over your 2 years in the Academic Learning Program, what ideas and /or experiences were particularly important to you in learning to teach? In what ways were they important?

Ideas:

Experiences:
(remind student of particular field experiences and courses, interactions with mentor, if these are not mentioned)

What important experiences were left out?

(OPTIONAL) Suppose you had started teaching without any of the teacher education experiences you've had. Do you think you would have been a different kind of teacher than you see yourself today? In what ways? Why?

NAME ____________________

Downer Street School had a fair.
How much food was not sold?

tens	ones
6	4
− 4	6

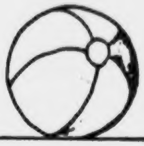
tens	ones
9	1
− 7	9

tens	ones
6	5
− 6	0

tens	ones
6	0
− 5	5

How many prizes were left?

tens	ones
4	3
−	9

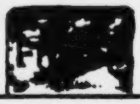


tens	ones
4	1
− 1	4

tens	ones
5	0
−	6

tens	ones
2	5
− 1	8

How much money does each child have left?



tens	ones
4	0
− 2	2

tens	ones
6	1
− 2	6

tens	ones
6	3
− 3	4

tens	ones
8	7
− 4	8

pages 217, 218

Subtraction with renaming

objectives

- Rename numbers so that there are more than 9 ones.
- Find the difference of two numbers less than 100.

pre-book activities

1. Put exercises similar to the following on the board.

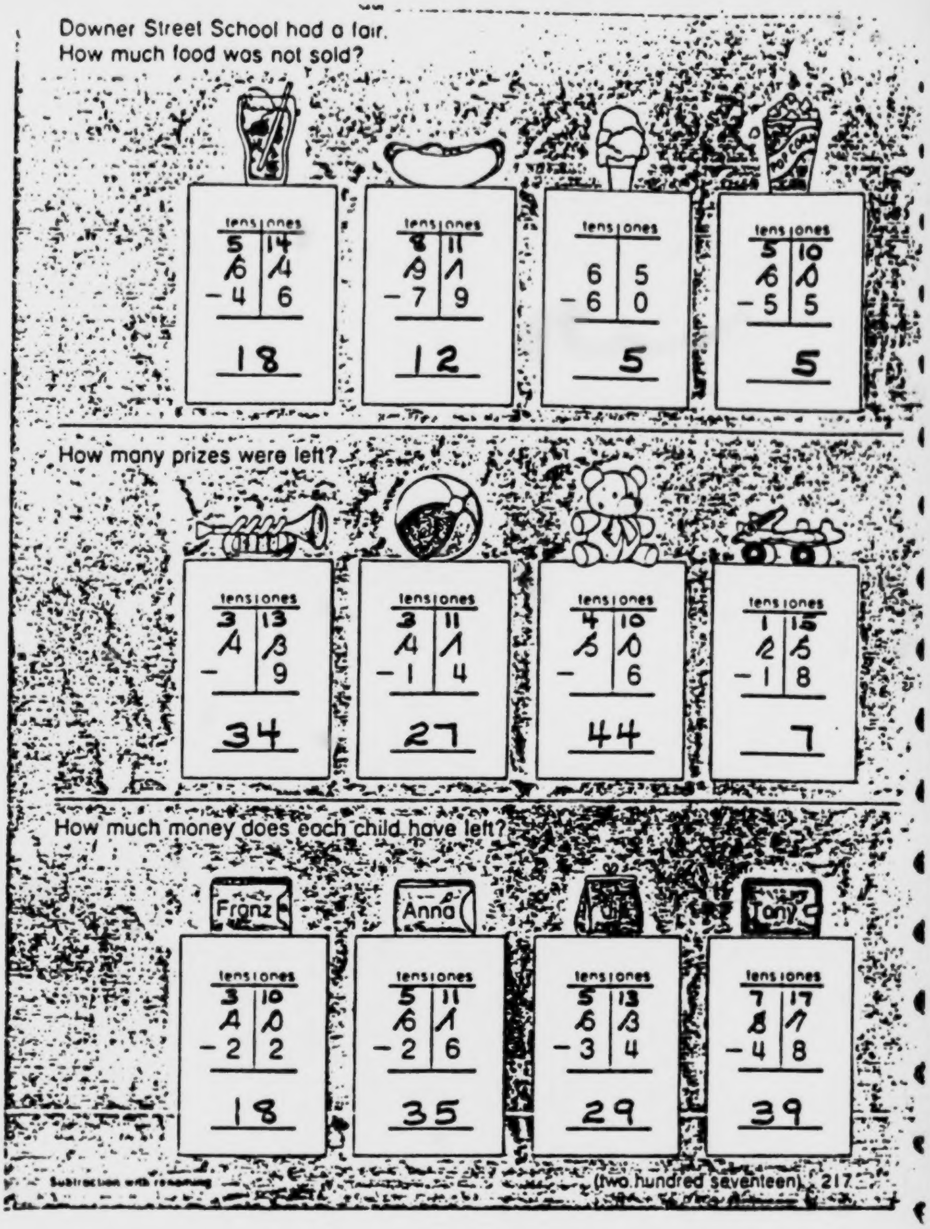
tens	ones	tens	ones
9	5	5	7
− 2	7	− 1	4

Have the children tell how they would find each difference. Then have them copy and complete each exercise. Ask various children to give the missing numbers for each exercise. Use the results of this activity to determine which children need more help before they do the work on pages 217-218.

2. For those children who need help, adapt and use the suggestions given for pages 215-216.

use of the pages

page 217 Before you have the children work the exercises independently, you may want to talk with the children about school fairs. Ask if any of them have been to a school fair, what kind of prizes they won, what kind of food they bought, and what other things they bought. After you read the directions, point out that the object at the top of each box shows the kind of object (or names the child), that the top number in each exercise tells how many things (or how much money) there were to begin with, and that the bottom number tells how many were sold (or how much was spent). After the children have found each difference, ask questions about each row. For example, for the bottom row, you might ask, "Who had the most money left? Who had the least? Who had more than 30¢ left? Who had less than 30¢?"



Downer Street School had a fair.
How much food was not sold?

tens	ones
5	14
$\cancel{6}$	$\cancel{4}$
− 4	6
18	

tens	ones
8	11
$\cancel{9}$	$\cancel{1}$
− 7	9
12	

tens	ones
6	5
− 6	0
5	

tens	ones
5	10
$\cancel{6}$	$\cancel{0}$
− 5	5
5	

How many prizes were left?

tens	ones
3	13
$\cancel{4}$	$\cancel{3}$
−	9
34	

tens	ones
3	11
$\cancel{4}$	$\cancel{1}$
− 1	4
27	

tens	ones
4	10
$\cancel{5}$	$\cancel{0}$
−	6
44	

tens	ones
1	15
$\cancel{2}$	$\cancel{5}$
− 1	8
7	

How much money does each child have left?

tens	ones
3	10
$\cancel{4}$	$\cancel{0}$
− 2	2
18	

tens	ones
5	11
$\cancel{6}$	$\cancel{1}$
− 2	6
35	

tens	ones
5	13
$\cancel{6}$	$\cancel{3}$
− 3	4
29	

tens	ones
7	17
$\cancel{8}$	$\cancel{7}$
− 4	8
39	

Subtraction with renaming (two hundred seventeen) 217

page 218 Have the children complete the exercises in the first row. When all are done, ask them what they noticed about the differences in this row (three of the differences are 23). Have the children circle, or mark in some other way, each exercise that has an answer of 23. Tell them that they are to work the exercises in each row and then circle the exercises that have the same difference.

post-book activities

1. Use any of the appropriate post-book activities suggested for pages 215-216.

2. Give each child the worksheet suggested in post-book activity 1 for pages 215-216, or use Teacher Aid 14. Tell a number story and have the children write the appropriate numerals in the box you designate and find the answer. Limit your stories to those in which the children must subtract to find the answers. The following are examples of stories you might use.

- 42 apples. 16 were sold. How many apples were left?
- 68 trucks. 35 buses. How many more trucks?
- 59 boys. 83 girls. How many more girls?
- 91 geese. 27 flew away. How many geese were left?

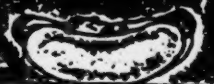
Elementary
Student Sample

NAME Susan

Downer Street School had a fair.
How much food was not sold?

tens	ones
6	4
−4	6

22

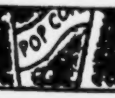


tens	ones
9	1
−7	9

28

tens	ones
6	5
−6	0

05



tens	ones
6	0
−5	5

15

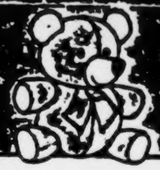
How many prizes were left?

tens	ones
~~4~~ 3	13
−	9

34

tens	ones
~~4~~ 3	11
−1	4

27



tens	ones
5	0
−	6

56

tens	ones
~~2~~ 1	15
−1	8

07.

How much money does each child have left?

tens	ones
4	0
−2	2

22

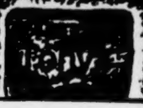
tens	ones
6	1
−2	6

45

307

tens	ones
6	3
−3	4

31



tens	ones
~~8~~ 7	17
−4	8

39

Appendix B

Interview Protocols for
Mentor Teachers

Mentor Teacher Project

Program Assessment Report

August, 1988

MENTOR TEACHER
INTERVIEW PROTOCOL #1

Dec, 1986

Introduction

Why I'm doing the study
Overview of the interview

General

-Why did you decide to participate as a mentor teacher in the Academic Learning Program?

-Have you had a student teacher before? How do you view being a mentor teacher in this program as different from being a cooperating teacher?

Questions About Current Junior

-Your student took TE 200C, Learning of School Subjects, this term. What did you understand to be the main purposes/goals of that course?

-Describe your initial impressions of your student.

What is the student's attitude toward teaching? learning to teach?
Assessment of any strengths or weaknesses?

-Tell me about the interactions you've had with this student this term.

Field assignments - nature of the assignment and how it played out
Other visists?
What kinds of questions did the student ask?

-What sense do you have of TE 200C instructors' goals for the field assignments?

-What do you think your student learned from these field assignments?

Significant insights, understandings

-Students have been studying learning theories in TE 200C this term - behaviorist, cognitive structures and disciplines (Bruner, Schwab), Piaget, cognitive science models, Dewey - by experience. Did your student ever talk to you (or write about) this?

What is your view of the importance of studying learning theory in learning to teach?

-Assignment #3 focused on what an individual student was learning. What value to you see in this assignment for a person learning to teach? Did your student use ideas about learning theories in carrying out this assignment?

-If you were asked to design a field assignment that would be particularly appropriate for your student at this point, what would it be?

-Ideally, what kind of a teacher would you like your student to be when she/he is finished student teaching?

What are the kinds of things the student needs to learn to become a good beginning teacher?

Image of the ideal teacher?

Thinking Back

-With either your senior or your junior, in what ways do you feel you have been helpful to the student. What would you say is the most important/helpful thing you did to support your student's growth as a teacher.

-Review field assignments so far with the senior. Did any particular field assignments have a real impact on your student's growth as a teacher?

-Is there anything that you have learned from working with your senior that will be helpful in working with your junior? Ways you'd like to change your role of "teacher educator"?

-Can you name 2-3 themes/ideas that seem to be emphasized in Academic Learning courses/program?

-Are there issues/ideas that seem to you not to be emphasized in the Academic Learning Program but that are appropriate or important for undergraduates who are learning to teach?

-Workshops: What is the most important function these meetings serve for you?

-Readings: We have given you several kinds of things to read - course syllabi, assignment sheets, articles being read in AL courses. Have any of these been particularly interesting or helpful to you?

-Do you feel like you are getting anything out of participating in the mentor project?

-Comments/reactions/questions

Mentor Teacher Project

Teacher Interview #2

March, 1987

Recently, we've been discussing that we have not met our goal of having mentor teachers serve as the link between Academic Learning course content and the realities of the classroom. We have recognized that perhaps teachers are operating on their own agenda which is quite different from ours. At times we have wondered whether we should give up on trying to reach our original goal and just let teachers do their thing and we'll do ours. In this interview, I would like to get clearer about the extent to which teachers are operating on a separate agenda and the extent to which they are understanding the program goals and trying to support the student in making links between Academic Learning courses and their field experiences. What enables or prevents them from helping students make such links? How much do the mentors value that linkage as a goal?

Another issue I want to explore in this interview is the extent to which the teachers see themselves as teacher educators. How much do they think about their Academic Learning student as a learner? What have they learned about being a more effective teacher educator?

I. Impressions of the student at this point.

a. What stands out for you at this point about your student, ____________?

b. Have your impressions/understandings of your student changed since the last interview?

- In what ways?
- What interactions with the student helped you develop new understandings of him/her?

c. What strengths do you see in this student?

d. Weaknesses?

e. What are your impressions of his/her subject matter competence?

- What evidence helped you make that assessment?

f. From your perspective, what were this student's most powerful learnings this term?

II. TE 205C - Curriculum Course Instructors: Andy - Math
Trudy Sykes - S.S.
Ed Smith - Science
Cheryl Rosaen - English

The field work your junior, ____________________, was doing this term was associated with TE 205C, the curriculum course.

a. What did you understand this course to be about from the meetings and handouts from the course instructors?

b. What have you learned about this course from your student (or from your student's written work)?

c. What do you wish you had known about the course?

d. Why would that knowledge be helpful to you?

e. How much do you think you need to know about the courses your student is taking to be an effective mentor?

f. In TE 205C, your student observed you (or your student teacher for elementary teachers) teaching one lesson early in the term and another lesson later in the term. What did you understand to be the purposes of those observations?

g. What do you think your student learned from observing you and talking with you about these observations?

h. What did you hope your student would learn from the intended, enacted, and actual curriculum assignments?

i. What do you think your student actually learned from that series of assignments?

-What is your evidence for that learning?

j. Did you think this was a good set of field assignments for the student? Explain why or why not.

k. Can you think of other kinds of field experiences that would have been equally or more important than the assignments the students did?

k. Describe the kinds of interactions you've had with ______________________ this term (Jan-March).

-How often were you able to talk to the student?
-What kinds of things did you discuss?
-Did you read the student's papers? give the student feedback?

l. What do you think ____________________ learned from you or from being in the classroom this term that

1) reinforced, supported or extended ideas being discussed in TE 205C?

2) were not specifically identified as learning goals for TE 205C?

m. Andy Anderson gave mentors a paper by Wilson and Shulman titled. "150 Different Ways of Knowing."

1) Did you have a chance to read it?

2) If yes, what stood out for you from that article?

Do you think it had useful messages for your student?

Did it help you in any way in working with ______________ this term?

3) If no, would you like to continue to get copies of articles that students are reading? Why or why not?

n) Any other comments you have about how things went this term with TE 205C?

III. Are there ideas that Academic Learning students are taught in their courses in the program that you think are unrealistic for use in "real" classrooms? Explain.

IV. What are different categories or kinds of knowledge that you think a person needs to know about in order to be an effective teacher?

On each of these cards I have some suggestions of kinds of knowledge effective teachers might need. First, I'd like you to put aside any that you think are not important or critical for a teacher to know about in order to be effective.

Next, which do you think are most important and why?

Which do you think are less important and why?

Looking at these cards, what are the areas you think your student needs to learn most about at this point?

Where/How do you think your student will learn those things?

Are there things that you think your student needs to learn about teaching that you cannot teach him/her as part of the field visits?

V. OPTIONAL

Elementary. - What do you hope your student will learn this term from field visits associated with the Science methods class?

What do you think are the most important things for these students to be learning about science teaching?

Secondary. - What do you hope to accomplish with your student this term during the weekly visit? What do you want your student to learn from these experiences? Why do you think that is important?

VI. What makes being a mentor teacher difficult?

VII. What makes being a mentor teacher interesting or rewarding?

VIII. Open for any comments or questions you may have.

TEACHER INTERVIEW #3
May-June, 1987

Purposes of this interview:

I think it would be helpful to push harder to understand whether or not mentors are supporting students in making linkages with Academic Learning courses and goals. In cases where they feel they are attempting to make such linkages, I'd like to get a better picture of what it is they do with the student. It seems to me that if the teachers are vague about program/course goals and emphases, it is doubtful they are doing much to support students in making linkages. If teachers disagree with program goals or emphases, how does that play out in what they do with students? Teachers who clearly disagree with us on some issues may still be quite effective in helping students think about program goals. On the other hand, they may make negative comments to students like, "you can't do that in real classrooms," that may be said in a way that communicates that this an absolute, a given.

This interview will focus mostly on your junior's work with you during Spring term.

Secondary only

This term your student was to come out once a week for a 2-3 hour time block. They were supposed to arrange their visits so that they had time to talk with you as well as to observe or participate in your classes.

1. How did you and your student use this time?

2. Did you find it difficult to find things for your student to do?
   Did the list of possible field activities the students were given help with this?
   Did our discussions at the beginning-of-the-term mentor meeting help with this?

3. What did you see as the advantages of this arrangement?

4. What did you see as the disadvantages of this arrangement?

5. Describe what you think your student learned from these weekly visits.

6. Can you think of ways in which you and your student could have used that time more productively?

Elementary Only

1. One assignment your student had as part of Glenn Berkheimer's science methods class was to teach a lesson (about anything) early in the term. Describe what your student taught, how it was planned (by you or by the student), and how it went.

2. What do you think your student learned from that experience?

3. Was the student's learning from that initial teaching experience reflected in the planning and teaching of the science unit?

UNIT PLANNING AND TEACHING

1. What did you see as the purpose of the unit planning and teaching assignment?

2. What difficulties/successes did your student have in planning the unit?

3. What role did you play in the planning process?

4. (Secondary teachers) Did you read your student's introductory essays about the content of the unit, about the text analysis and critique, and about the preassessment of student knowledge? If so, what were your reactions to what they wrote?

Did you talk to the student about these reactions?

Did you agree/disagree with comments made on the paper by the course instructors? Please describe.

How important do you think it is that we teach the Academic Learning students to do a preassessment of student prior knowledge as part of the planning process?

Explain your reasons for your position - why is it important or not so important?

5. What difficulties did your student have in actually teaching the unit?

6. What successes did your student have in actually teaching the unit?

7. What role do you think your written feedback about the student's teaching played?

Is written feedback important? In what ways? For whom?

In TE 205C last term students were encouraged to think about representing the subject matter in a variety of ways to students. Can you give any evidence that your student thought about this in planning and/or teaching the unit?

8. Glenn Berkheimer (elementary)/AL instructors (secondary) talk about teaching for "conceptual change." Is that an idea that makes sense to you? Why or why not?

How do you see a conceptual change modlel of science instruction as being different from a "reading the textbook, present the facts" approach to teaching?

(elementary and secondary science only) How do you see a conceptual change model of science instruction as being different from a "discovery" orientation to science teaching?

(Secondary math, ss, and English) Does a conceptual change orientation to thinking about teaching and learning make sense in your subject area?

Does the conceptual change idea seem to be something that is important to your student? Explain.

In your student's unit, can you point to things that he or she did that were consistent with the emphasis on helping students go through this conceptual change process.

9. What changes would you recommend for the Spring term field assignments?

10. Mentors, course instructors, and students all worked hard to plan the units. If we had students teach their unit earlier in the term, they would be less well planned. Does that bother you? Why or why not? What are the advantages/disadvantages of teaching the unit earlier in the term?

11. At our last secondary mentor meeting, some teachers talked about the conflicting advice students were being given about their unit plans. Sometimes there was an apparent conflict between the mentor's advice about the unit and the course instructor's advice.

Can you describe any ways in which your student might have felt such conflict? Please give specific examples.

If there was such conflict, what did you think about the instructor's advice? What did you tell your student about how to resolve the perceived conflict?

12. At that meeting a mentor described as a conflict between himself and the course instructors the issue of breadth vs. depth. The mentor wanted a certain amount of content covered in the unit week. The course instructors were pushing for the Academic learnign student to explore some issue related to that content in some depth - to help the students really change and develop some central concept/idea, fitting in facts as supporting details. The program was saying to the student - "teach for meaningful conceptual understanding rather than only having students memorize lots of facts, definitions, formulas, procedures." THe conflict the student felt was "How can I cover all this content (which he viewed primarily as lots of facts) and still have time to do anything in depth?"

Did you have a similar problem with your student's unit?

During student teaching, how will you react if your student argues for an extra week on a given topic because he/she wants to work on helpign students develop deeper understandigns of the content? (What will you say to your student?)

Where do you stand on this breadth vs. depth issue?

Is it more of a problem in certain subject areas/classes?

What pressures are on you to cover certain amounts of content?

Are there ways in which you are encouraged or rewarded for teaching for understanding even if that means not covering as much content?

13. Let the teacher look over th e list of program goals. Pick out goals that you felt like you worked with your studetn on during Spring term. Describe ways in which you worked on them.

14. We've talked a bit about AL program emphases and goals. What ideas/issues do You think should be emphasized in helping people learn to teach?

Do you disagree with any of the issues we are emphasizing in Academic Learning?

CLASSROOM MANAGEMENT

15. What do you think your student learned from you about classroom management this term? How did you help the student learn that?

16. What do you think your student learned from AL courses about classroom management this term?

MEETINGS

17. Andy Anderson suggested at our last secondary mentor meeting that mentors and AL faculty need to meet together for an occasional longer session to develop a more common language as we work with AL students. Do you think this would be productive? Why or why not?

18. In a longer session, we might be able to involve teachers in resolving some of the problems that are brought up. To date, program faculty have been taking teacher feedback and suggestions and making decisions about how to resolve them. Do you think the mentors should be more involve din helping to resolve issues of concern?

STUDENT STRENGTHS AND WEAKNESSES

19. How have your impressions of your student changed over the year?

20. What do you see as areas of growth and learning this year for your junior?

21. Describe your students' strengths and weaknesses at this point. (sources of evidence?)

22. Let teacher look at list of program goals again. What areas do you want to work with your student on during student teaching (secondary) or during the practicum (elemenatry) in the Fall?

Do you have ideas about how you will work with this student differently than you did with your first student during (secondary - student teaching; elementary - language arts practicum)? Why do you think you will change the way you work with the student?

23. How would you rate the realtive importance of field experiences and experiences in AL classes in helping your studetn learn to teach?

23. OPEN. Any comments, questions, concerns about any part of the Academic Learning Program, mentor teacher project, etc.
ASK MONA FOR NAMES OF TEACHERS POTENTIALLY INTERESTED AT RALYA OR TEACHERS SHE THINKS WOULD BE GOOD.

Mentor Teacher Project

Mentor Teacher Interview #4 - Elementary

December, 1987
End of Language Arts Practicum/Interdisciplinary
Curriculum/Social Studies Methods Courses

1. What stands out for you at this point about your senior student?

2. What do you see as this student's strengths? How do these contribute to good teaching?

3. What do you see as this student's weaknesses? How do these hinder good teaching?

4. Have your impressions/understandings of your student changed since the last interview?

    --In what ways?
    --What interactions with the student helped you develop new understandings of her?

5. Your student has had several types of field experiences this term - the beginning of the year observations, the bi-weekly visits for the practicum, and some structured assignments for the Interdisciplinary course in which she had to plan and teach some lessons using reciprocal teaching strategies. Which of these were important and helpful to your student?

Describe the kinds of things you think your student learned from each of the field assignments.

beginning of year management observations -

bi-weekly visits for LA practicum -

lessons for interdisciplinary course -

6. Overall, have you seen much growth in the student this term?

What key experiences or support contributed to such growth?

7. Describe the kinds of interactions you have had with your senior this term.

   --nature and frequency/duration of discussions
   --role in planning for practicum and 306 lessons, reading students' plans
   --feedback to student about her teaching - written, oral
   --role in unit planning, reading student plans being developed in courses

8. Did you have a particular agenda in mind as you worked with the student? (for example, were there particular areas in which you focused your comments and suggestions? Were there particular areas in which you wanted to see growth?)

If you were to repeat your work w/ the student this term, What would you keep the same? Do differently? Why?

9. What kind of planning did the student do this term? What frustrations or difficulties did the student have with planning?

10. Did your student ever come up with a new idea about what to teach or an activity that she wanted to try out this term? If so, what is an example of such an idea and how did you respond to it?

Do you want your student to take the initiative and come up with new ideas and new ways of doing things or do you prefer that she use your ideas and methods? Why?

(In what areas is it easiest/most difficult to allow the student to try new things?)

Are there course concepts or methods student wants to try/did try that conflict w/ your ideas/methods? How do they conflict? Ideas about how S can still be supported in trying them?

Suppose during student teaching, your student was teaching a math unit and found that students were able to do the computations pretty well but did not really understand the reasons why the rules worked. Your student asked you if she could spend another week on the unit in order to help the students understand the concepts behind the computations. How would you respond to the student?

11. What kinds of interactions did you and your student have with the field instructor this term? What issues did the field instructor work on with the student?

12. Did you ever think that the AL course instructors were giving your student messages that conflicted with your own advice and beliefs? If so, describe.

13. What changes in the field experiences this term might have even better supported your student in learning to teach? (suggestions about changes in structure, focus, expectations, etc.)

Change in your role?

14. One of the major goals or themes addressed in Academic Learning classes is that meaningful, conceptual understanding should be a major goal of teaching.

a) What is your current understanding of that goal?

b) Do you support that program theme? Are there areas in your curriculum that make this theme diffic to realize/implement?

c) Is that a goal that you have worked with your student on? In what ways?

d) Do you see evidence in your student's planning, teaching, or informal talk that shows that the student is thinking hard about the students' conceptual understanding? Examples.

15. The AL program also stresses that in order to teach for conceptual understanding, you have to get students involved in actively constructing meaning. Students need to be actively engaged in the learning process and not just passively receiving information from the teacher, a textbook or a worksheet. One thing this means is that the students must have many opportunities to talk and write about their thinking.

a) Do you support that program theme? Areas in curric that make this theme diffic to realize/implement?

b) Is that a goal you have helped you student work on? In what ways?

c) Do you see evidence in your student's planning, teaching, or informal talk that shows the student is thinking hard about involving the students actively in the learning process? Examples.

16. (optional) Are there ideas/strategies that students are taught about in AL classes that youthink are unrealistic for use in "real" classrooms? Explain.

17. Look at the list of program goals we used during student teaching last year. Which ones do you think will be the most difficult for your student to achieve?

Of those that will be difficult for your student, which ones do you feel most prepared to help the student with?

18. OPEN. Any comments or questions you have about any aspect of the Academic Learning Program, the Mentor Teacher Project, meetings, etc?

Mentor Teacher Project
TEACHER INTERVIEW #4
SECONDARY TEACHERS

November, 1987
During Student Teaching

1. What stands out for you at this point about your student?

2. What do you see as this student's strengths?

3. What do you see as this student's weaknesses?

4. In what ways do you see this student's experiences in the Academic Learning Program last year as being helpful in helping him/her learn to teach?

Are there experiences the student could have had last year that would have improved his/her readiness to student teach?

5. How do you view your role this term?

Do you view your role any differently than you did last year when you worked with your first student teacher?

6. Describe your interactions with the student this term (nature of interactions - planning, observing, feedback, reflection; frequency).

7. In your interactions with the student, what are the issues/questions you bring up and try to help the student work on?

8. How have mentor teacher meetings helped you in working with your student? Ways they could have been more helpful?

9. How do you view the role of the student teaching observer?

Describe the kinds of interactions you have had with the student teaching observer.

What are the issues/questions that the student teaching observer seems to be working on with the student?

Have there been any occasions when you felt the student was getting conflicting messages, advice from you and from the student teaching observer? If so, how did you handle the situation?

10. Your student was required to develop one unit plan this term. What do you see as the purpose of this assignment? Do you think this assignment contributes to the student teaching experience in significant ways? Describe.

How is the kind of planning and teaching the student did in this unit different or similar to the planning during the rest of student teaching?

What role did you play in the development of the unit plan?

11. Compare how the student did with the unit teaching assignment last Spring and how the student is doing now. Have you noticed growth? What contributed to that growth? If no growth, why not?

12. One of the original goals of the Mentor Teacher Project was for mentor teachers to actively support students in inking program studies and real classroom experiences

Do you think that is a reasonable and worthwhile goal?

In what ways do you think you've achieved that goal in working with your student?

In what ways have you been helped in reaching that goal? (What has made that goal possible to achieve?)

In what ways have you been constrained in reaching that goal? (What has made that goal difficult to achieve?)

What changes would have to made in the way the MTP is organized to make that goal possible to achieve in meaningful ways?

Questions 13-16 could be treated as optional, depending on time and on how much information the mentor gave in Question 11. The purpose of this series of questions is to get clearer about what mentors do/do not understand about program goals and the extent to which they are working with students toward these goals.

13. One program goal is to view conceptual understanding as a major goal of teaching.

    Do you support that program theme?

    Can you describe an example of how you have helped your student think about that goal?

14. The AL Program also stresses that in order to teach for conceptual understanding, you have to understand your subject area in very rich ways - seeing the usefulness of the particular knowledge being taught, understanding why particular knowledge is worth teaching, seeing how particular content fits in with the discipline as a whole, being able to think flexibly about the content so you can present it to kids in a variety of ways.

    Do you support this program goal?

    Does your student show evidence of having these kinds of subject matter understandings? Does he/she recognize areas that need to be worked on? Does he/she make efforts to develop such understandings?

14. Another program theme focuses on the need for students to be actively engaged in the learning process (rather than passive recipients and memorizers of knowledge).

Do you support this Program goal?

In what ways does your student meet or fail to meet this goal?

Are there ways in which you have tried to help the student work on this goal? Describe an example.

16. Another program goal is that students should have clear learning goals in mind during the planning process. Instead of thinking up activities that would be fun for students to do, the teacher should select activities that will best promote the intended learnings.

Do you support this Program goal?

Have you seen evidence that your student centers planning around both long and short-term learning goals?
Have you noticed your student developing ideas of activities or pages to cover first or problems to assign, before learning goals have been clearly defined?

Are there ways in which you have tried to help the student work on this Program goal? Describe an example.

OPTIONAL - save for Winter term interview?
16. There is a lot of discussion these days about possible reforms in preservice teacher education programs (Holmes, Carnegie, etc.) If you had free rein to design an ideal student teaching experience for (your student), what would you recommend? What changes might really help (your student) get the best possible start in learning-to-teach?

GUIDELINES FOR HELPING STUDENTS WORK TOWARD PROGRAM GOALS

	Strong indications that students are linking Academic Learning goals with classroom teaching experiences:	Indications that students are not linking Academic Learning program goals with classroom teaching experience:
Working with People	The student teacher values, respects each student's thinking and actively elicits and considers students' thinking in planning and teaching.	The student teacher is impatient with students who don't "catch on" quickly and blames student learning difficulties on students' lack of effort.
	The student teacher initiates conversations with the mentor teacher about his/her teaching, asking for help in understanding the successes and failures of lessons.	The student teacher does not initiate conversations with the mentor (or other school personnel) about professional issues, or conversations are limited to "how to" without asking "why".
Planning for Instruction	Seeks and uses information about students' prior knowledge in planning.	Focuses on content-to-be-covered without thinking much about students' prior knowledge and probable learning difficulties; Assumes coverage means learning.
	Selects tasks/activities/questions that will engage student thinking and develop student understanding of of central concepts/ideas - focuses on learning concerns.	Selects tasks/activities/questions because they will keep students orderly and busy, or the students will like them or because that's what comes next in the textbook - focuses on management concerns without serious consideration of learning issues.
	Builds on information about student understanding gained from such tasks for further planning.	Information from evaluation tasks is used mainly for grading purposes - it is not used to shape instruction.
Establishing Classroom Climate and Managing Instruction	Teacher and students are actively engaged together in making sense of meaningful concepts and skills.	Teacher and students get along well and classroom is busy but students are satisfied to just get the tasks done, they ignore the content of instruction as much as possible.

Management		Time management: Prepares for classes effectively and efficiently, with an appropriate sense of priorities in deciding what needs to be done.	Spends too much time on some things and not enough on others, leading to inadequate preparation and disorganized classes.
		Classroom organization: Organizes and explains rules and procedures that enable classroom to run smoothly and efficiently.	Procedures and rules not adequately worked out or inconsistently enforced. Materials are sometimes not ready or planning incomplete.
		Dealing with minor disruptions: Deals with minor disruptive behavior such as talking unappropriately in a fair and consistent way. Helps students understand rules and learn how to follow them.	Enforcement of rules too lax, inconsistent, or harsh and arbitrary. Fails to help students understand rules and learn to follow them.
		Dealing with severe behavior problems: Works with students who have severe behavioral or emotional problems in an organized and professional way. Helps them to develop and follow through on reasonable plans to overcome their problems.	Falls in to unproductive patterns in dealing with problem students, such as nagging, open frustration, or inconsistent enforcement of rules.
		Teacher continually elicits and responds to students' ideas in order to shape and challenge student understanding. Teacher thinks about: How are students making sense of this? Why are they going astray?	Classroom interaction is primarily teacher to student: teacher lectures and asks evaluation questions (Do the students know this or not?)
Command of Subject	✓	Can identify central concepts and skills that are critical for students to understand for a given unit of instruction.	Takes an everything-you-could-possibly-know approach to content coverage - has a difficult time picking out key concepts.
	✓	Understands the subject matter in such a way that applications to everyday/"real world" situations can be made. Can think of questions that will challenge students to apply concepts, skills, ideas to relevant situations.	Student has a fact or formula - oriented understanding of the subject matter. Cannot think up or even recognize good application questions. Cannot see alternate ways to organize subject matter besides the textbook organization.

Personal and Professional	✓	Genuine concern for meaningful, conceptual learning by students is a goal that drives the student teacher's professional behavior.	The student teacher is conscientious about being prepared daily but focuses more on having something for the class to do than on what the students will learn.
	✓	The student teacher reflects carefully on his/her teaching and asks questions of other professionals to work on learning problems the students are having.	The student teacher is satisfied if things are pleasant and orderly and does not puzzle about learning failures of particular students.
	/	The student teacher identifies areas he/she needs to learn more about in order to be an effective teacher and has made efforts to gain that knowledge (whether it be content knowledge, management skills, communication skills, etc.)	The student teacher responds to suggestions from the university observer about areas that he/she needs to learn more about, but does not seek such knowledge on his/her own.
		The student teacher welcomes feedback from mentor teacher and university observer as a learning opportunity.	The student teacher views feedback from the mentor or the university observer primarily as evaluative. ("Am I doing a good job or not?")

Mentor Teacher Project

TEACHER INTERVIEW #5

ELEMENTARY TEACHERS

March, 1988

End of Student Teaching

1. a. From your perspective, what are the most important things this student teacher learned this term?

-- Why do you think these were important learnings?

b. What evidence do you have of change/growth in the student over the student teaching term?

c. Can you identify specific experiences during the student teaching term that fostered these important learnings? (For example, ways in which you or the 470C instructor worked with the student).

2. In what areas do you wish the student teach had developed better understandings?

-- What hindered such learnings from occurring?

-- What do you think would have made it possible for such learnings to occur?

3. What do you see as this student's strengths? How do these contribute to good teaching? Give an example of how you recognized these strengths.

4. What do you see as this student's weaknesses? How do these hinder good teaching? Give examples of how you recognized such weaknesses.

5. Describe the strengths and weaknesses of this student's planning.

   -- Probe for comments about daily vs. unit planning.

   -- What is your evidence for this (how often did you see plans, what discussions did you have with the student about daily and/or unit planning).

6. a. What role did the unit planning requirements play in influencing the student's approach to long-term planning? In what ways were these requirements helpful? not helpful?

b. What parts of the required unit planning process did you think were most important in helping this student develop good plans and teach effectively?

Central question/focus

List of concepts (definitions of concepts)

Concept map or outline

Objectives

Assessment questions

Activities

Why?

7. In what ways were this student's experiences in the Academic Learning Program prior to student teaching helpful in preparing him/her to student teach?

Are there experiences the student could have had last year that would have improved his/her readiness to student teach?

8. How do you view your role this term?

Do you view your role any differently than you did last year with your first student teacher?

9. Describe your interactions with the student this term (interactions - planning, observing, feedback, reflection; frequency).

   a. Nature and frequency of interactions - planning, observing, feedback, reflection?

   b. What issues/questions did you bring up and try to help the student work on?

   c. How receptive was the student to your suggestions?

   d. What kinds of questions did your student ask you?

Rank the relative importance of the following in helping you support this student teacher's growth (Pick 3-4 most important ones).

_____ reviewing and talking with the student about daily lesson plans

_____ reviewing unit plans

_____ helping the student develop plans, find resources

_____ mentor teacher meetings

_____ written feedback to the student teacher about your observations of the student's teaching

_____ informal discussions with the student about her teaching

_____ midterm conference/report

_____ participation in post-observation conferences with the 470C instructor and the student

_____ conversations with the 470C instructor

_____ other

10. How did you help your student teacher learn about classroom management?

11. How have mentor teacher meetings helped you in working with your student? Ways they could have been more helpful?

12. How do you view the role of the 470C instructor?

Describe the kinds of interactions you have had with the 470C instructor. In what ways were your interactions with the 470C instructor helpful to you (you may want to compare experiences with last year)?

What are the issues/questions that the 470C instructor worked on with the student?

Have there been any occasions when you felt the student was getting conflicting messages, advice from you and from the 470C instructor? If so, how did you handle the situation?

13. Look at the Student Teaching Guidelines sheet. What evidence or counter evidence do you have that this student is making progress toward the checked Academic Learning Program goals? Give specific examples.

-- Be sure mentor reads both columns - the "ideal" student teacher and its contrast.

-- The checked goals probe teachers' understanding of AL program goals regarding:

a. conceptual understanding as a major goal of teaching and selecting tasks that actively involve students in the learning of meaningful content -

b. importance of understanding students' prior knowledge and ways of thinking -

c. need for rich subject matter understandings (structure/functions) in order to teach conceptually -

d. importance of reflection in learning to teach -

14. Can you identify ways in which you have helped your student work toward any of these program goals? Give examples.

What helps you/constrains you in helping your student work toward these goals?

15. Would you characterize this student as meeting Academic Learning goals and as being a conceptual change-oriented teacher? Explain.

16. Ideally, how should the student teaching experience be structured and supervised to promote learning to teach in a conceptual change manner?

GUIDELINES FOR HELPING STUDENTS
WORK TOWARD PROGRAM GOALS

	Strong indications that students are linking Academic Learning goals with classroom teaching experiences:	Indications that students are not linking Academic Learning program goals with classroom teaching experience:
I. Working with People	A. Relations With Students The student teacher values, respects each student's thinking and actively elicits and considers students' thinking in planning and teaching.	The student teacher is impatient with students who don't "catch on" quickly and blames student learning difficulties on students' lack of effort.
	B. Relations With Mentors The student teacher initiates conversations with the mentor teacher about his/her teaching, asking for help in understanding the successes and failures of lessons.	The student teacher does not initiate conversations with the mentor (or other school personnel) about professional issues, or conversations are limited to "how to" without asking "why".
	C. Relations with 470C Instructor, Other Professionals	
II. Planning for Instruction	A. Comprehension of Student Understanding Seeks and uses information about students' prior knowledge in planning.	Focuses on content-to-be-covered without thinking much about students' prior knowledge and probable learning difficulties; Assumes coverage means learning.
	B. Transformation: Developing Tasks and Activities Selects tasks/activities/questions that will engage student thinking and develop student understanding of of central concepts/ideas - focuses on learning concerns.	Selects tasks/activities/questions because they will keep students orderly and busy, or the students will like them or because that's what comes next in the textbook - focuses on management concerns without serious consideration of learning issues.
	Builds on information about student understanding gained from such tasks for further planning.	Information from evaluation tasks is used mainly for grading purposes - it is not used to shape instruction.
III. Establishing Classroom Climate and Managing Instruction	A. Classroom Climate Teacher and students are actively engaged together in making sense of meaningful concepts and skills.	Teacher and students get along well and classroom is busy but students are satisfied to just get the tasks done, they ignore the content of instruction as much as possible.

	B. Time Management Prepares for classes effectively and efficiently, with an appropriate sense of priorities in deciding what needs to be done.	Spends too much time on some things and not enough on others, leading to inadequate preparation and disorganized classes.
	C. Classroom Organization Organizes and explains rules and procedures that enable classroom to run smoothly and efficiently.	Procedures and rules not adequately worked out or inconsistently enforced. Materials are sometimes not ready or planning incomplete.
	D. Dealing With Minor Disruptions Deals with minor disruptive behavior such as talking unappropriately in a fair and consistent way. Helps students understand rules and learn how to follow them.	Enforcement of rules too lax, inconsistent, or harsh and arbitrary. Fails to help students understand rules and learn to follow them.
	E. Dealing With Severe Behavior Problems Works with students who have severe behavioral or emotional problems in an organized and professional way. Helps them develop and follow through on reasonable plans to overcome their problems.	Falls in to unproductive patterns in dealing with problem students, such as nagging, open frustration, or inconsistent enforcement of rules.
	F. Communication About Content Teacher continually elicits and responds to students' ideas in order to shape and challenge student understanding. Teacher thinks about: How are students making sense of this? Why are they going astray?	Classroom interaction is primarily teacher to student: teacher lectures and asks evaluation questions (Do the students know this or not?)
IV. Command of Subject	A. Understanding Structure of Content Can identify central concepts and skills that are critical for students to understand for a given unit of instruction.	Takes an everything-you-could-possibly-know approach to content coverage - has a difficult time picking out key concepts.
	B. Understanding Functions of Content Understands the subject matter in such a way that applications to everyday/"real world" situations can be made. Can think of questions that will challenge students to apply concepts, skills, ideas to relevant situations.	Student has a fact or formula - oriented understanding of the subject matter. Cannot think up or even recognize good application questions. Cannot see alternate ways to organize subject matter besides the textbook organization.

V. Personal and Professional	A. Concern for Meaningful Learning Genuine concern for meaningful, conceptual learning by students is a goal that drives the student teacher's professional behavior.	The student teacher is conscientious about being prepared daily but focuses more on having something for the class to do than on what the students will learn.
	B. Reflection on Teaching The student teacher reflects carefully on his/her teaching and asks questions of other professionals to work on learning problems the students are having.	The student teacher is satisfied if things are pleasant and orderly and does not puzzle about learning failures of particular students.
	C. Analysis of Teaching The student teacher identifies areas he/she needs to learn more about in order to be an effective teacher and has made efforts to gain that knowledge (whether it be content knowledge, management skills, communication skills, etc.)	The student teacher responds to suggestions from the university observer about areas that he/she needs to learn more about, but does not seek such knowledge on his/her own.
	D. Receptivity to Feedback The student teacher welcomes feedback from mentor teacher and university observer as a learning opportunity.	The student teacher views feedback from the mentor or the university observer primarily as evaluative. ("Am I doing a good job or not?")

Appendix C

Interview Protocols for
Student Teaching Observers

Mentor Teacher Project

Program Assessment Report

August, 1988

MENTOR TEACHER PROJECT

Interview Protocol for Secondary Student Teaching Observers
November, 1987

Purposes of this Interview. The interview with the observer can help us get a fuller picture of what the student teaching experience was like for the case study student. Perpsectives and insights from the observer can help confirm (or raise questions about) the extent to which the student teacher's behaviors reflect program goals, the role of the mentor in supporting the student to work toward program goals, and the experiences and interactions which were particularly helpful to the student in enabling him/her to become a more conceptual change-oriented teacher. This interview will also provide important insights about the role of the observer vs. the role of the mentor. The interview is divided into three main sections - questions about the student teacher's planning and teaching behaviors, questions about the observer's role, and questions about the mentor teacher role.

Make sure that the person being interviewed knows that most of the questions will focus on the case study student and his/her mentor teacher.

I. Student Teacher Planning, Teaching, and Growth - the questions in this section are designed to get a picture of the extent to which this student teacher's behaviors reflect Academic Learning Program goals and to identify experiences that promoted (or hindered) the development of such behaviors.

1. From your perspective, what are the most important things this student teacher learned this term?
    - --*Why* do you think these were important learnings?
    - --Do you think the student teacher would identify the same issues as critical areas of learning? (or does the student teacher focus on different issues as most important to him/her?)

2. Can you identify specific experiences during the student teaching term that fostered these important learnings?

3. In what areas do you wish the student teacher had developed better understandings?
    - --What hindered such learning from occurring?
    - --What do you think would have made it possible for such learnings to occur?

4. What do you see as this student teacher's strengths? Give an example of how you recognized one of these strengths and how it contributed to good teaching.

5. What do you see as this student teacher's weaknesses? Give examples of how you recognized such weaknesses.

6. Describe this student teacher's typical approach to daily planning. (What things are taken into consideration in planning? What gets the most emphasis in the planning process - activities, the subject matter, the mentor's plans, the textbook, student learning, links to larger goals,etc.)

--What is your evidence for this (how often did you see plans, what discussions did you have with the student about daily planning)

7. Describe this student teacher's typical approach to unit or long-term planning. (What things are taken into consideration in planning? What gets the most emphasis in the planning process - activities, the subject matter, the mentor's plans, the textbook, student learning, links to other units, etc.)

--What is your evidence for this (how often did you see plans, what discussions did you have with the student about unit planning)

8. Look at the Student Teaching Guidelines sheet. What evidence or counter evidence do you have that this student is making progress toward the checked Academic Learning Program goals? What makes each of these goals difficult for your student teacher to achieve? (Pick from the goals checked - if observer has already commented on some of these in answering other questions, skip them).

9. On the following scale, how would you rate this student's student teaching behaviors - as being very close to the conception of a conceptual change teacher addressed in the program, emphasizing conceptual development and understanding? or as being closer to a fact-driven, more didactic type of teacher?

1 2 3 4 5 6 7 8 9 10

fact-acquisition teacher: procedures and rules emphasis, didactic orientation	conceptual change teacher: conceptual understanding, problem-solving orientation

Give examples of teaching behaviors (and the frequency of particular kinds of teaching behaviors) that you used to place this student on the continuum.

10. How does this student's placement on the continuum compare with other student teachers you are working with this term? (only applies to Eugenio, Saundra, Glenn)

11. What evidence do you have of change in the student teacher over the student teaching term? What experiences fostered this change?

--In what areas have you seen growth in the student?

12. What is your assessment of what it would take to get this student to move farther toward the right on this scale? (what would foster such growth at this point in time?)

--What changes in the Academic Learning Program might have helped this student look more like a conceptual change teacher by the end of student teaching? (What experiences could ______ have had last year, for example, that would have enabled him/her to look more like a conceptual change teacher during student teaching?)

13. What is your assessment of why the student is/is not a conceptual change teacher?

14. What is your assessment of key experiences the student has had this term or in earlier terms that helped him/her move toward the right on this continuum?

II. Observer's Role

1. How do you see your role as student teaching observer?

2. How well prepared do you feel for this role? What could have prepared you for it better?

3. Describe the kinds of interactions you have had this term with the student teacher (both the nature and frequency of such interactions).

--During these interactions, what kinds of issues have you been trying to get the student to work on? How did you decide to work on these issues? Once you identify an issue to work on, how do you work on it?

--What kinds of issues does the student teacher bring to you?

4. How receptive has your student been to your suggestions, questions, advice? What evidence is there that the student finds your suggestions helpful (or that the student does not understand or respond to your suggestions)?

5. What constrains your effectiveness in helping this student become a conceptual change teacher?

6. What is the nature of the seminars and your role in them?

--What role does your student teacher play in these seminars?

III. Mentor Teacher Role

1. How does your role and your interactions with the student compare with the mentor teacher role? (complementary roles?)

2. What insights do you have about the nature and frequency of interactions this student has with the mentor? What is your source of information on this?

3. In what ways do you see the mentor teacher as being helpful to this student?

4. What kinds of questions/issues does the student bring to the mentor?

5. Does the mentor teacher help the student work toward program goals? In what ways?

--Are there ways in which the mentor is not helpful to the student? Ways in which the mentor gives the student messages that conflict with Academic Learning goals?

6. What are the constraints that make it difficult for the mentor to work toward program goals? Or what enables the mentor to achieve that goal?

7. What is the nature and frequency of your interactions with the mentor?

8. Do you think the mentor teachers are playing a different role for students than cooperating teachers used to? IF so, is the amount of gain worth all the time and effort put into working with these mentors?

IV. Overall Assessment of the Student Teaching Experience

1. Ideally, how should the student teaching experience be structured and supervised to promote learning to teach in a conceptual change manner?

2. For observers who knew their student prior to this term:

Do you think the student teaching experience has "washed out" the effects of the first year experiences in the program for this student teacher?

MENTOR TEACHER PROJECT

Interview Protocol for Elementary 470C Instructors
March, 1988

Purposes of this Interview. The interview with the 470C instructor can help us get a fuller picture of what the student teaching experience was like for the case study student. Perspectives and insights from the 470C instructor can help confirm (or raise questions about) the extent to which the student teacher's behaviors reflect program goals, the role of the mentor in supporting the student to work toward program goals, and the experiences and interactions which were particularly helpful to the student in enabling him/her to become a more conceptual change-oriented teacher. This interview will also provide important insights about the role of the 470C instructor vs. the role of the mentor. The interview is divided into three main sections - questions about the student teacher's planning and teaching behaviors, questions about the 470C instructor's role, and questions about the mentor teacher role.

**** Make sure that the person being interviewed knows that most of the questions will focus on the case study student and his/her mentor teacher.

I. Student Teacher Planning, Teaching, and Growth - the questions in this section are designed to get a picture of the extent to which this student teacher's behaviors reflect Academic Learning Program goals and to identify experiences that promoted (or hindered) the development of such behaviors.

1. a) From your perspective, what are the most important things this student teacher learned this term?
   - -- Why do you think these were important learnings?
   - -- Do you think the student teacher would identify the same issues as critical areas of learning? (or does the student teacher focus on different issues as most important to him/her?)

   b) What evidence do you have of change/growth in the student teacher over the student teaching term? What experiences fostered this change?

2. Can you identify specific experiences during the student teaching term that fostered these important learnings? (For example, ways in which you or the mentor worked with the student).

3. In what areas do you wish the student teacher had developed better understandings?

    -- What hindered such learning from occurring?

    -- What do you think would have made it possible for such learnings to occur?

4. What do you see as this student teacher's strengths? Give an example of how you recognized one of these strengths and how it contributed to good teaching.

5. What do you see as this student teacher's weaknesses? Give examples of how you recognized such weaknesses.

6. a) Describe this student teacher's approach to unit or long-term planning. (What things are taken into consideration in planning? What gets the most emphasis in the planning process - activities, the subject matter, the mentor's plans, the textbook, student learning, links to other units, etc.)

-- What is your evidence for this (how often did you see plans, what discussions did you have with the student about unit planning)

b) What role did the unit planning requirements play in influencing the student's approach to long-term planning?

c) Which parts of the unit planning process did you put the most emphasis on in working with this student:

central question/focus
List of concepts (definitions of concepts)
Concept map or outline
Objectives
Assessment questions
Activities

Why?

7. What comments can you make about this student's daily planning? (What got the most emphasis in the planning process - activities, the subject matter, the mentor's plans, the textbook, student learning, links to larger goals, etc.)

-- What is your evidence for this (how often did you see plans, what discussions did you have with the student about daily planning)

8. Look at the Student Teaching Guidelines sheet. What evidence or counter evidence do you have that this student is making progress toward the checked Academic Learning Program goals? What makes each of these goals difficult for your student teacher to achieve? (Pick from the goals checked - if 470C instructor has already commented on some of these in answering other questions, skip them).

9. On the following scale, how would you rate this student's student teaching behaviors - as being very close to the conception of a conceptual change teacher addressed in the program, emphasizing conceptual development and understanding? or as being closer to a fact-driven, more didactic type of teacher?

1 2 3 4 5 6 7 8 9 10

fact-acquisition teacher: procedures and rules emphasis, didactic orientation	conceptual change teacher: conceptual understanding, problem-solving orientation

Give examples of teaching behaviors (and the frequency of particular kinds of teaching behaviors) that you used to place this student on the continuum.

10. How does this student's placement on the continuum compare with other student teachers you are working with this term?

11. What is your assessment of key experiences the student has had this term or in earlier terms that helped him/her move toward the right on this continuum?

12. What is your assessment of why the student is/is not a conceptual change teacher?

13. What is your assessment of what it would take to get this student to move farther toward the right on this scale? (what would foster such growth at this point in time?)

-- What changes in the Academic Learning Program might have helped this student look more like a conceptual change teacher by the end of student teaching? (What experiences could ______ have had last year, for example, that would have enabled him/her to look more like a conceptual change teacher during student teaching?)

II. 470C Instructor/s Role

1. How do you see your role as 470C instructor?

2. Did you see this role any differently this year compared with past years? Explain.

3. How well prepared do you feel for this role? What helped you prepare for this role? What could have prepared you for it better?

4. Describe the kinds of interactions you have had this term with the student teacher (both the nature and frequency of such interactions).

-- During these interactions, what kinds of issues have you been trying to get the student to work on? How did you decide to work on these issues? Once you identify an issue to work on, how do you work on it?

-- What kinds of issues does the student teacher bring to you?

5. How receptive has your student been to your suggestions, questions, advice? What evidence is there that the student finds your suggestions helpful (or that the student does not understand or respond to your suggestions)?

6. What constrains your effectiveness in helping this student become a conceptual change teacher?

7. Rank the relative importance of the following in helping you support this student teacher in meeting program goals. Please describe reasons for these rankings (probe to find out ways these interactions were important to the student's growth toward program goals).

_____ Discussions with the student teacher about unit plans

_____ Observations of the student's teaching and discussions with the student teacher about these observations

_____ student teaching seminars

_____ midterm essay about a unit

_____ midterm conference

_____ 470C instructor meetings

_____ conversations with the mentor teacher

_____ Mentor teacher meetings on campus

_____ final conference and final essay

_____ other

III. Mentor Teacher Role

1. How does your role and your interactions with the student compare with the mentor teacher role? (complementary roles?)

2. What insights do you have about the nature and frequency of interactions this student has with the mentor? What is your source of information on this?

3. In what ways do you see the mentor teacher as being helpful to this student?

4. Does the mentor teacher help the student work toward program goals? In what ways?

5. Are there ways in which the mentor is not helpful to the student? Ways in which the mentor gives the student messages that conflict with Academic Learning goals?

6. What are the constraints that make it difficult for the mentor to work toward program goals? Or what enables the mentor to achieve that goal?

7. What is the nature and frequency of your interactions with the mentor?

8. Do you think the mentor teachers are playing a different role for students than cooperating teachers used to? If so, is the amount of gain worth all the time and effort put into working with these mentors?

IV. Overall Assessment of the Student Teaching Experience

1. Ideally, how should the student teaching experience be structured and supervised to promote learning to teach in a conceptual change manner?

2. Do you think the student teaching experience has "washed out" the effects of the first year experiences in the program for this student teacher?

GUIDELINES FOR HELPING STUDENTS
WORK TOWARD PROGRAM GOALS

	Strong indications that students are linking Academic Learning goals with classroom teaching experiences:	Indications that students are not linking Academic Learning program goals with classroom teaching experience:
I. Working with People ⓑ ✓	A. Relations With Students The student teacher values, respects each student's thinking and actively elicits and considers students' thinking in planning and teaching.	The student teacher is impatient with students who don't "catch on" quickly and blames student learning difficulties on students' lack of effort.
	B. Relations With Mentors The student teacher initiates conversations with the mentor teacher about his/her teaching, asking for help in understanding the successes and failures of lessons.	The student teacher does not initiate conversations with the mentor (or other school personnel) about professional issues, or conversations are limited to "how to" without asking "why".
	C. Relations with 470C Instructor, Other Professionals	
II. Planning for Instruction	A. Comprehension of Student Understanding Seeks and uses information about students' prior knowledge in planning.	Focuses on content-to-be-covered without thinking much about students' prior knowledge and probable learning difficulties; Assumes coverage means learning.
ⓐ ✓	B. Transformation: Developing Tasks and Activities Selects tasks/activities/questions that will engage student thinking and develop student understanding of of central concepts/ideas - focuses on learning concerns.	Selects tasks/activities/questions because they will keep students orderly and busy, or the students will like them or because that's what comes next in the textbook - focuses on management concerns without serious consideration of learning issues.
ⓑ ✓	Builds on information about student understanding gained from such tasks for further planning.	Information from evaluation tasks is used mainly for grading purposes - it is not used to shape instruction.
III. Establishing Classroom Climate and Managing Instruction	A. Classroom Climate Teacher and students are actively engaged together in making sense of meaningful concepts and skills.	Teacher and students get along well and classroom is busy but students are satisfied to just get the tasks done, they ignore the content of instruction as much as possible.

		B. Time Management Prepares for classes effectively and efficiently, with an appropriate sense of priorities in deciding what needs to be done.	Spends too much time on some things and not enough on others, leading to inadequate preparation and disorganized classes.
		C. Classroom Organization Organizes and explains rules and procedures that enable classroom to run smoothly and efficiently.	Procedures and rules not adequately worked out or inconsistently enforced. Materials are sometimes not ready or planning incomplete.
		D. Dealing With Minor Disruptions Deals with minor disruptive behavior such as talking unappropriately in a fair and consistent way. Helps students understand rules and learn how to follow them.	Enforcement of rules too lax, inconsistent, or harsh and arbitrary. Fails to help students understand rules and learn to follow them.
		E. Dealing With Severe Behavior Problems Works with students who have severe behavioral or emotional problems in an organized and professional way. Helps them develop and follow through on reasonable plans to overcome their problems.	Falls in to unproductive patterns in dealing with problem students, such as nagging, open frustration, or inconsistent enforcement of rules.
		F. Communication About Content Teacher continually elicits and responds to students' ideas in order to shape and challenge student understanding. Teacher thinks about: How are students making sense of this? Why are they going astray?	Classroom interaction is primarily teacher to student: teacher lectures and asks evaluation questions (Do the students know this or not?)
IV. Command of Subject	ⓒ ✓	A. Understanding Structure of Content Can identify central concepts and skills that are critical for students to understand for a given unit of instruction.	Takes an everything-you-could-possibly-know approach to content coverage - has a difficult time picking out key concepts.
	ⓒ ✓	B. Understanding Functions of Content Understands the subject matter in such a way that applications to everyday/"real world" situations can be made. Can think of questions that will challenge students to apply concepts, skills, ideas to relevant situations.	Student has a fact or formula - oriented understanding of the subject matter. Cannot think up or even recognize good application questions. Cannot see alternate ways to organize subject matter besides the textbook organization.

V. Personal and Professional		A. Concern for Meaningful Learning Genuine concern for meaningful, conceptual learning by students is a goal that drives the student teacher's professional behavior.	The student teacher is conscientious about being prepared daily but focuses more on having something for the class to do than on what the students will learn.
	✓	B. Reflection on Teaching The student teacher reflects carefully on his/her teaching and asks questions of other professionals to work on learning problems the students are having.	The student teacher is satisfied if things are pleasant and orderly and does not puzzle about learning failures of particular students.
(d) <	✓	C. Analysis of Teaching The student teacher identifies areas he/she needs to learn more about in order to be an effective teacher and has made efforts to gain that knowledge (whether it be content knowledge, management skills, communication skills, etc.)	The student teacher responds to suggestions from the university observer about areas that he/she needs to learn more about, but does not seek such knowledge on his/her own.
		D. Receptivity to Feedback The student teacher welcomes feedback from mentor teacher and university observer as a learning opportunity.	The student teacher views feedback from the mentor or the university observer primarily as evaluative. ("Am I doing a good job or not?")

OW/2AL-60

Appendix D

Class of 88 Student Questionnaires

Mentor Teacher Project

Program Assessment Report

August, 1988

Mentor Teacher Project
Student Questionnaire
Entry -- September, 1986

1. Personal Data

a. Name: ____________________

b. Address: ____________________ Phone: ____________________

____

c. Secondary or elementary? ____________________

d. Term you will be student teaching: F88 W89 other (Explain) __________

e. Planned date of graduation __________

f. Access to car: Now? Yes No During Student Teaching? Yes No

2. Subject matter background

a. Major: __________ minor(s): __________

b. Describe your background in your major/minor (What kinds of courses have you taken? Do you have outside-of-class experiences related to your subject matter area(s)? Do you have particular interests or strengths within your major/minor area? Any weakness?)

c. Ideally, what school subjects would you like to teach in your first job after graduation?

d. Describe any concerns/areas of weakness in subject areas that you might be asked to teach in your first job after graduation. (For example, a history major may feel prepare to teach American history, but weak in geography. An elementary major may feel strong in science but weak in the social sciences.)

3. Experiences working with school age children

4. Mentor Teacher Plan

   a. Describe briefly the most important way(s) in which you think this mentor teacher arrangement can help you in learning to teach: (You may include thoughts about why you want to teach, what is important for you to learn about teaching, your professional aspirations)

   b. List any questions you have about the Mentor Teacher Plan:

5. Placement Information

a. Level: Please indicate 1st and 2nd choices. Early Elementary (K-3) _____ Upper Elementary (3-6) _____ Middle School (6-9) _____ High School (9-12) _____

State reasons for any preference:

b. Concerns: There are a number of things you might think about in deciding what kind of placement would be most beneficial for you. Most people first think about practical concerns such as proximity to the university or to the home. While those practical concerns are important, please also think about the potential for your learning about teaching that different settings might provide. With that thought in mind, describe either practical concerns or concerns related to your growth as a teacher that you would like considered in placing you with a mentor teacher.

Practical concerns:

Learning concerns:

c. Other

6. Describe any interests, hobbies, or other personal information that might help us make an appropriate match with a mentor.

q/pel-14

Name______________________________

EVALUATION OF ACADEMIC LEARNING PROGRAM
BY FIRST YEAR STUDENTS

May 24, 1987

1. Describe 1-3 ways in which your ideas about good teaching have changed as a result of your experiences this year in Academic Learning classes and in your mentor teacher's classroom.

2. Describe 1-3 ways in which your ideas about student learning of school subjects have changed as a result of your experiences this year in Academic Learning classes and in your mentor teacher's classroom.

3. Describe experiences in the program this year that have had a particularly significant impact on your thinking about teaching and/or learning. Explain how they influenced your thinking about teaching. (Be as specific as possible. For example, don't just name a course or say "field visits." Instead, describe particular events, readings, field visits, class activities etc.).

4. We are interested in the relative importance for you of a) field assignments and b) experiences in Academic Learning classes (including lectures, discussion groups, readings, etc.). On a scale from 1 to 5, how would you rate the contributions that each has made to your thinking and learning about teaching?

1 2 3 4 5 Contributions of experiences
very little a great deal in Academic Learning classes

1 2 3 4 5 Contributions of field
very little a great deal assignments and visits

Explain your choices.

5. Describe any ideas you have been taught in Academic Learning classes that you think are unrealistic for use in "real" classrooms. Why?

6. Describe any concerns you have about your knowledge of the school subjects you will be teaching next year (any areas in which you realize you need to develop better understandings?).

7. Describe things your mentor teacher has done or said that have been particularly helpful to you in learning to teach.

8. Describe ways in which your mentor teacher could be more helpful to you.

9. What suggestions do you have about ways in which Academic Learning courses and field assignments could better help you in learning to teach?

10. What do you hope to learn from your experiences in Academic Learning next year?

11. Other comments/concerns/questions.

Name ________________________________

ACADEMIC LEARNING PROGRAM
STUDENT EVALUATION QUESTIONNAIRE
FALL TERM, 1987
WINTER TERM, 1988

A. EVALUATION OF THE STUDENT TEACHING EXPERIENCE

1. Indicate subject areas/grade levels you taught:

2. What were the most important areas of professional learning for you during the student teaching experience? Give brief examples of the kinds of things you learned in each area.

3. Describe your areas of strength as a student teacher.

4. Describe things that discouraged you or that you found difficult during student teaching.

5. Describe ways you tried to assess student understanding of your lessons.

6. What problems did your students have with conceptual change? Please comment.

7. Name the subject area(s) in which you would like to: build further subject matter knowledge in order to improve your teaching:

   Describe what kinds of things you feel like you need to understand better about these subject matters.

8. Explain ways that field experiences prior to student teaching (in TE 200C, 205C, methods courses, elementary language arts practicum and 306C) were helpful/not helpful in preparing you to teach. Also name field assignments that were particularly helpful or not helpful.

9. Think back over all your courses in Academic Learning. Describe 3 ideas/theories/ teaching strategies/etc. discussed in the courses that stand out for you as being particularly important to you in your growth as a teacher. Why are they important to you?

10. Please react to the unit and daily planning requirements during student teaching:

    a. In what ways were these helpful/not helpful to you?

    b. Comment about the importance to you of each part of the unit planning requirements and whether this is something you will use prior to teaching a unit when you are on your own?

        - central question/focus:

        - list of concepts:

        - concept map, outline, chart, etc:

        - list of objectives:

        - sample assessment questions:

    c. What did you learn from writing the reflective essays about two units of instruction?

11. You will continue to learn about teaching and about the subjects you teach throughout your teaching career. Name 1-3 areas that you would like to learn more about.

How will you learn about these?

470C INSTRUCTOR

12. In what ways was your 470C instructor particularly helpful in your learning to teach?

13. In what ways were the information, support, and interaction available at student teaching seminars helpful?

Were there specific seminars that were more helpful than others? If so, which ones? Why?

14. Other comments about 470C instructor:

MENTOR (OR COOPERATING) TEACHER

15. In what ways was your mentor or cooperating teacher particularly helpful to your learning about teaching?

16. Describe ways in which your mentor or cooperating teacher supported or failed to support your efforts to teach for conceptual understanding (rather than for memorization and rote recall, for example).

17. Other comments about mentor or cooperating teacher:

B. MENTOR TEACHER FIELD PLAN

18. You had a number of field experiences in your mentor's classroom that were requirements for Academic Learning courses. We are interested in the relative importance you place on the field experiences and on the study you did in Academic Learning courses (readings, lecture, discussions, etc.). On a scale from 1 to 5, how would you rate the contributions that each has made to your thinking and learning about teaching?

1	2	3	4	5	Contributions of experiences
very little			a great deal		in Academic Learning classes

1	2	3	4	5	Contributions of assigned
very little			a great deal		field experiences

Explain your choices.

19. The mentors are very interested in knowing the ways of interacting with student teachers that are most helpful. Please give them your advice!:

    a. List things your mentor did (at any point in your program) that were particularly helpful:

    b. List things your mentor did not do, but that would have been helpful:

20. Suppose you found yourself in a classroom and a school in which you had the freedom to take charge of all curriculum and teaching decisions. Can you describe one way in which you would do things differently from the way things were done in your mentor teacher's classroom/school?

C. OVERALL ACADEMIC LEARNING PROGRAM

21. Each of us has an image of what the ideal teacher is like. Have your ideas about the ideal teacher (at your grade level or in your subject area) changed over the last two years? In what ways?

22. In a job interview situation you may be asked to describe what is distinctive about the Academic Learning Program. How would you describe the most important messages or themes in the Academic Learning Program?

23. Are there ideas/strategies you were taught in Academic Learning classes that you think are unrealistic for use in "real" classrooms?__________ If yes, give an example and explain why.

24. Other comments about your experiences thus far in Academic Learning (please use back).

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Appendix D

Class of 88 Student Questionnaires

Mentor Teacher Project

Program Assessment Report

August, 1988

Teacher Application/Information Form

MENTOR TEACHER PROJECT

RETURN TO:
Perry Lanier
Mentor Teacher Project
College of Education
201 Erickson Hall
East Lansing, MI 48824

Name: ______________________________

School: ______________________________

School Address: ______________________________

School Phone: ____________________

Home Address: ______________________________

____

Home Phone: ______________________________

Social Security Number: ______________________________

Teaching Assignment: Grade(s) __________ Subject(s) __________

1. Teaching Experience

   a. Number of years you have taught:

   b. Number of years taught in current school district:

   c. Grade levels and subjects you have taught:

   d. Subject area strengths/interests:

2. Professional Studies and Activities

   a. Undergraduate Major: Minor (if applicable):

   b: Describe masters degree study or other study beyond undergraduate degree:

   c. Describe educational or school related activities participated in other than school district in-service or graduate study (e.g. workshops, professional meetings, committee work, extra curricular programs):

d. What kinds of things do you read that help you as a teacher?

e. Participation in professional organizations:

3. Previous work with preservice teachers:

a. Have you had experience as a cooperating teacher for a student teacher?

b. Other experiences with preservice teachers (e.g. practicum, volunteers, observers):

c. Name any MSU faculty you have worked with:

4. Mentor Teacher Project

a. Comments about your own background or teaching situation that would contribute to your work with the Mentor Teacher Project:

b. From your perspective, what do you see as the strengths of the Mentor Teacher Project?

c. Discuss any concerns or reservations you have about the Project:

d. Suggest others in your department or building who might be interested in the Project:

e. Additional Comments (e.g. other time commitments, questions):

ow/3mtp-17

Mentor Teacher__________________________
June, 1986

TEACHER FEEDBACK ABOUT THE MENTOR TEACHER PROJECT

We have now worked together on the Mentor Teacher Project for two terms. At this point it would be helpful in assessing our progress to get written feedback from each of you. Please take a few minutes to answer the following questions and return this to us by June 4, 1986.

1. Over the past two terms, how often were you able to talk with your student? Was this amount of time sufficient to begin to develop a useful relationship with your student?

2. a) Looking back across the two terms, how helpful to your student have the field experiences been?

   b) How realistic and manageable have the field experiences been for both your student and for you?

3. One of our goals in this project has been to involve teachers in a more central role in the Academic Learning Program. We have tried to do this by helping you understand our program goals. Please comment on what you have learned about the program from:

   a) our meetings together -

   b) course readings and syllabi we have shared with you -

   c) your student -

   d) Other sources (assignment sheets, letters we've sent, informal discussions with faculty, information-exchange sessions, etc.) -

4. At this point, in what ways do you feel you are most able to help your student?

5. Looking back at the meetings we have had, what have you gained from those and what do you wish you had gained? What do you think we should be accomplishing in these sessions?

6. How have the realities of the mentor teacher experience met or failed to meet your expectations?

7. In early September, we will be identifying an incoming junior to begin work with you. Do you have any information that will help us in matching a student with you (ie, subjects and grade level you will be teaching next year)?

8. Other comments, concerns.

Mentor Teacher__________________________

Return to: Kathy Roth
201 Erickson Hall
College of Education
Michigan State Univ
East Lansing, MI 48824

MENTOR TEACHER EVALUATION OF THE MENTOR TEACHER PROJECT

May. 1987

1. What advantages and/or disadvantages have you found in working with the same student over time?

2. One of the goals of the Mentor Teacher Project is to help students link what they are studying in courses with "real" classrooms. Describe one example of something your student learned in an Academic Learning class that he/she discussed with you or tried to incorporate into his/her unit teaching.

   Do you and your student talk about what he/she is studying in Academic Learning classes?________Please comment.

3. Do any of the ideas that students have been taught in Academic Learning courses seem unrealistic for use in classrooms?______If yes, please give an example.

4. The list of program goals that we used during student teaching is attached. Give your reactions to one or two of these goals.

5. An important function of our meetings together is to get feedback and suggestions from mentors about field assignments and course goals. Do you feel free to give suggestions and do you think that Academic Learning faculty are responsive to your concerns? Please comment.

6. Have the field assignments been both manageable and helpful to your student?______Explain.

Do you have suggestions for alternative field assignments?

7. Looking back at the meetings we have had, what have you gained from those and what do you wish you had gained?

8. How have the realities of the mentor teacher experience met or failed to meet your expectations?

9. If you want to begin working with a new junior student in the Fall, please give us any information that will help us in matching you with a student (ie, subjects and grade level you will be teaching next year).

GUIDELINES FOR HELPING STUDENTS WORK TOWARD PROGRAM GOALS

	Strong indications that students are linking Academic Learning goals with classroom teaching experiences:	Indications that students are not linking Academic Learning program goals with classroom teaching experience:
Working with People	The student teacher values, respects each student's thinking and actively elicits and considers students' thinking in planning and teaching.	The student teacher is impatient with students who don't "catch on" quickly and blames student learning difficulties on students' lack of effort.
	The student teacher initiates conversations with the mentor teacher about his/her teaching, asking for help in understanding the successes and failures of lessons.	The student teacher does not initiate conversations with the mentor (or other school personnel) about professional issues, or conversations are limited to "how to" without asking "why".
Planning for Instruction	Seeks and uses information about students' prior knowledge in planning.	Focuses on content-to-be-covered without thinking much about students' prior knowledge and probable learning difficulties; Assumes coverage means learning.
	Selects tasks/activities/questions that will engage student thinking and develop student understanding of of central concepts/ideas - focuses on learning concerns.	Selects tasks/activities/questions because they will keep students orderly and busy, or the students will like them or because that's what comes next in the textbook - focuses on management concerns without serious consideration of learning issues.
	Builds on information about student understanding gained from such tasks for further planning.	Information from evaluation tasks is used mainly for grading purposes - it is not used to shape instruction.
Establishing Classroom Climate and Managing Instruction	Teacher and students are actively engaged together in making sense of meaningful concepts and skills.	Teacher and students get along well and classroom is busy but students are satisfied to just get the tasks done, they ignore the content of instruction as much as possible.

Management	Time management: Prepares for classes effectively and efficiently, with an appropriate sense of priorities in deciding what needs to be done.	Spends too much time on some things and not enough on others, leading to inadequate preparation and disorganized classes.
	Classroom organization: Organizes and explains rules and procedures that enable classroom to run smoothly and efficiently.	Procedures and rules not adequately worked out or inconsistently enforced. Materials are sometimes not ready or planning incomplete.
	Dealing with minor disruptions: Deals with minor disruptive behavior such as talking unappropriately in a fair and consistent way. Helps students understand rules and learn how to follow them.	Enforcement of rules too lax, inconsistent, or harsh and arbitrary. Fails to help students understand rules and learn to follow them.
	Dealing with severe behavior problems: Works with students who have severe behavioral or emotional problems in an organized and professional way. Helps them to develop and follow through on reasonable plans to overcome their problems.	Falls in to unproductive patterns in dealing with problem students, such as nagging, open frustration, or inconsistent enforcement of rules.
	Teacher continually elicits and responds to students' ideas in order to shape and challenge student understanding. Teacher thinks about: How are students making sense of this? Why are they going astray?	Classroom interaction is primarily teacher to student: teacher lectures and asks evaluation questions (Do the students know this or not?)
Command of Subject	Can identify central concepts and skills that are critical for students to understand for a given unit of instruction.	Takes an everything-you-could-possibly-know approach to content coverage - has a difficult time picking out key concepts.
	Understands the subject matter in such a way that applications to everyday/"real world" situations can be made. Can think of questions that will challenge students to apply concepts, skills, ideas to relevant situations.	Student has a fact or formula - oriented understanding of the subject matter. Cannot think up or even recognize good application questions. Cannot see alternate ways to organize subject matter besides the textbook organization.

Personal and Professional	Genuine concern for meaningful, conceptual learning by students is a goal that drives the student teacher's professional behavior.	The student teacher is conscientious about being prepared daily but focuses more on having something for the class to do than on what the students will learn.
	The student teacher reflects carefully on his/her teaching and asks questions of other professionals to work on learning problems the students are having.	The student teacher is satisfied if things are pleasant and orderly and does not puzzle about learning failures of particular students.
	The student teacher identifies areas he/she needs to learn more about in order to be an effective teacher and has made efforts to gain that knowledge (whether it be content knowledge, management skills, communication skills, etc.)	The student teacher responds to suggestions from the university observer about areas that he/she needs to learn more about, but does not seek such knowledge on his/her own.
	The student teacher welcomes feedback from mentor teacher and university observer as a learning opportunity.	The student teacher views feedback from the mentor or the university observer primarily as evaluative. ("Am I doing a good job or not?")

k/pel-26

Mentor Teacher ________________________

Senior Student ________________________

MENTOR TEACHER PROJECT

Mentor Teacher Questionnaire
End of Year 3 - Secondary

December, 1987

I. Evaluation of your Class of 88 student's progress this year.

1. In what ways did you think your senior was well prepared to student teach?

2. What aspects of the Academic Learning Program (including course work, field assignments, your work with the student) were most useful in preparing your senior for student teaching? Why?

3. In what ways did you think your senior could have been better prepared for student teaching?

4. What aspects of the Academic Learning Program did you find least useful in preparing your student for student teaching? Why?

5. a) In what areas did your student make the greatest growth during the student teaching term?

b) What experiences/support fostered such growth?

6. Rank the following areas to show the areas in which you felt you were most able to help the student grow (1 = most influential, 7 or 8 = least influential).

__ Working with people (including students, other teachers)

__ Long-term planning (units)

__ Daily planning

__ Classroom management, routines, and organization

__ Dealing with student discipline problems

__ Assessing and evaluating student learning (including grading, testing, etc.)

__ Analyzing lessons taught and learning from experience

__ Development of professional attitudes

__ Other

Please comment on ways in which you were helpful in the areas you ranked as 1 and 2.

Were there any areas in which you were unsure of how to best help your student improve? Please comment.

7. One of the goals/themes of the Academic Learning Program is that meaningful, conceptual understanding (in contrast with rote learning) should be a major focus of classroom teaching.

   a) Describe examples of ways your student teacher worked toward this goal (or failed to make much progress in achieving this goal).

   b) In what ways were you able to support your student in working toward this goal?

8. Another program theme focuses on the need for students to be actively involved in the learning process (rather than passive recipients of knowledge through lecture).

   a) Describe examples of ways your student worked toward this goal (or failed to make much progress toward this goal).

   b) In what ways were you able to support your student in working toward this goal?

9. Describe ways in which the mentor meetings held during student teaching contributed (or did not contribute) to your effectiveness in helping your student work toward program goals.

10. a) List ways in which the university observer was helpful to you.

b) List ways in which the university observer was helpful to your student.

c) Do you have suggestions for ways in which the observer could be more helpful?

II. Overall Evaluation of your experience in Academic Learning Program as a mentor teacher.

1. What advantages and/or disadvantages have you found in working with the same student over time?

2. One of the goals of the Mentor Teacher Project is for mentor teachers to help students link what they are studying in Academic Learning courses with "real" classrooms.

   a) Do you think this is a reasonable and worthwhile goal? ____________
   If no, please explain.

b) In what ways do you think you have achieved that goal in working with your student(s)?

c) What has helped you reach that goal and/or what has made that goal difficult to achieve?

d) What changes can you suggest that might help mentors better achieve that goal?

3. Do any of the ideas that students are taught in Academic Learning courses seem unrealistic or irrelevant to your classroom? If yes, please give an example.

4. An important function of our meetings together is to get feedback and suggestions from mentors about field assignments and course goals. Do you feel free to give suggestions and do you think that Academic Learning faculty are responsive to your concerns? Please comment.

5. a) Why did you decide to become a mentor teacher?

b) How have the realities of the mentor teacher experience met or failed to meet your expectations?

6. Do you have any questions or further comments about any aspects of the Academic Learning Program and its Mentor Teacher Project?

ow/2al-37

Mentor Teacher ________________________

Senior Student ________________________

MENTOR TEACHER PROJECT

Mentor Teacher Questionnaire
End of Year 3 - Elementary
May, 1988

I. Evaluation of your Class of 88 student's progress this year.

1. In what ways did you think your senior was well prepared to student teach?

2. What aspects of the Academic Learning Program (including course work, field assignments, your work with the student) were most useful in preparing your senior for student teaching? Why?

3. In what ways did you think your senior could have been better prepared for student teaching?

4. What aspects of the Academic Learning Program did you find least useful in preparing your student for student teaching? Why?

5. a) In what areas did your student make the greatest growth during the student teaching term?

b) What experiences/support fostered such growth?

6. Rank the following areas to show the areas in which you felt you were most able to help the student grow (1 = most influential, 7 or 8 = least influential).

__ Working with people (including students, other teachers)

__ Long-term planning (units)

__ Daily planning

__ Classroom management, routines, and organization

__ Dealing with student discipline problems

__ Assessing and evaluating student learning (including grading, testing, etc.)

__ Analyzing lessons taught and learning from experience

__ Development of professional attitudes

__ Other

Please comment on ways in which you were helpful in the areas you ranked as 1 and 2.

Were there any areas in which you were unsure of how to best help your student improve? Please comment.

7. One of the goals/themes of the Academic Learning Program is that meaningful, conceptual understanding (in contrast with rote learning) should be a major focus of classroom teaching.

   a) Describe examples of ways your student teacher worked toward this goal (or failed to make much progress in achieving this goal).

   b) In what ways were you able to support your student in working toward this goal?

8. Another program theme focuses on the need for students to be actively involved in the learning process (rather than passive recipients of knowledge through lecture).

   a) Describe examples of ways your student worked toward this goal (or failed to make much progress toward this goal).

   b) In what ways were you able to support your student in working toward this goal?

9. Describe ways in which the mentor meetings held during student teaching contributed (or did not contribute) to your effectiveness in helping your student work toward program goals.

10. a) List ways in which the university observer was helpful to you.

    b) List ways in which the university observer was helpful to your student.

    c) Do you have suggestions for ways in which the observer could be more helpful?

II. Overall Evaluation of your experience in Academic Learning Program as a mentor teacher.

1. What advantages and/or disadvantages have you found in working with the same student over time?

2. How have your ideas about ways to mentor Academic Learning students effectively changed since you first started working with Academic Learning.

3. One of the goals of the Mentor Teacher Project is for mentor teachers to help students link what they are studying in Academic Learning courses with "real" classrooms.

   a) Do you think this is a reasonable and worthwhile goal? ____________
   If no, please explain.

   b) In what ways do you think you have achieved that goal in working with your student(s)?

   c) What has helped you reach that goal and/or what has made that goal difficult to achieve?

   d) What changes can you suggest that might help mentors better achieve that goal?

4. Do any of the ideas that students are taught in Academic Learning courses seem unrealistic or irrelevant to your classroom? If yes, please give an example.

5. An important function of our meetings together is to get feedback and suggestions from mentors about field assignments and course goals. Do you feel free to give suggestions and do you think that Academic Learning faculty are responsive to your concerns? Please comment.

6. a) Why did you decide to become a mentor teacher?

   b) How have the realities of the mentor teacher experience met or failed to meet your expectations?

7. Do you have any questions or further comments about any aspects of the Academic Learning Program and its Mentor Teacher Project?

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Appendix F

Guidelines for Observing
Case Study Students

Mentor Teacher Project

Program Assessment Report

August, 1988

MENTOR TEACHER PROJECT

Classroom Observations and Informal Interviews with Case Study Students

Fall, 1987

Rationale for Observations of Case Study Students in the Field

During 1986-87 we conducted a series of interviews and collected written assignments in order to document changes in 12 case study students' thinking about teaching and learning as a result of experiences in the Academic Learning Program (including both formal coursework and experiences in the field). Most these students underwent significant conceptual change in their thinking about teaching, about learning, about the subject matter knowledge needed to teach, and about the process of learning to teach. Many students now hold ideas about teaching and learning that seem to match closely with Academic Learning goals and a conceptual change orientation to teaching. The big question nowis whether the students' actual teaching behaviors (including their planning, evaluation of student learning, and reflections on their teaching) will also meet program goals. Will the students continue to link program goals with their experiences in the field now that those experiences are less structured? What roles do mentors/observers/faculty play in supporting students in teaching for conceptual change during student teaching and the language arts practicum?

Types of Records Needed

-Descriptions of actual teaching behaviors by case study students, including:

a) field notes taken as the student teaches to document the kinds of things that do not show up in written lesson plans (how the student teacher responds to students, how long the teacher pursues a concept that students are having trouble with, etc.).

b) written lesson plans including both the required unit plan for student teaching and samples of more routine types of plans. Plans for both observed lessons and unobserved lessons would be of interest.

-Summaries of informal/formal discussions with the student, including:

a)description of post-observation discussions - what issues were discussed? What issues were raised by the student? by the observer? Any insights into the planning and reflecting that the student did regarding the observed lesson?

b) description of interactions in formal seminars (either in 470C or 311C)

c) informal "interview" questions asked of the student

-Summaries of informal discussions with the student's mentor teacher

-Summaries of informal discussions with the student's observer or course instructor

-Student teacher journals (?) (optional)

MENTOR TEACHER PROJECT

Observations and Informal Interviews with Case Study Students: ISSUES BEING EXPLORED

As described in Part III of the July, 1987 Progress Report, we are using these weekly observations to document:

a) the nature of the interactions between mentors and students,
b) the nature of the interactions between university supervisors or faculty and Academic Learning students,
c) key learnings and issues of concern each week (or every other week) for Academic Learning students,
d) descriptions of the Academic Learning students' actual teaching,
e) descriptions of evidence that Academic Learning students are drawing from or rejecting ideas studied in Academic Learning courses, and
f) changes in student thinking and action over the term (and reasons for those changes).

In each of the interviews last year, we tried to understand Academic Learning students' thinking about:

a) teaching,
b) learning,
c) the subject matter knowledge needed to teach, and
d) the process of learning to teach.

We also wanted to understand how particular people and experiences influenced students' thinking about these four broad areas. A key goal of the Mentor Teacher Project is to help students learn from both formal study and from experience and to make links between these two sources of knowledge in learning to teach.

Below are listed some of the kinds of questions that we would like to be able to answer based on our observations and interviews with students this term. I've tried to put questions under the broad headings listed above (teaching, learning, subject matter knowledge needed to teach, the process of learning to teach, and the roles of various persons/experiences in learning to teach). Obviously, these categories overlap a lot - one question asked of a student can get at more than one category of issues. However, I thought that this framework might help us make sure that we are learning as much as we can about the key issues that we explored with the students last year in the interviews. I am certainly open to ideas about alternative ways to organize this.

Teaching

What kinds of teaching strategies does the student favor? scorn? Why? What are the sources of influence on these opinions?

What teaching strategies are actually used most frequently by the student? Why? Does this mesh with the student's theoretical perspective?

In what ways do the teaching strategies used by the student imitate or match closely with those used by the mentor?

In what ways do they match (or fail to match) a conceptual change model of instruction?

What goals of teaching seem most important to the student (executive concern with order and management, therapist concern with development of self-concept, liberationist concern with subject matter learning, some idiosyncratic view of teaching)?

Learning

Do concerns about student learning drive the planning process? In what ways? Are long-term plans altered because of unanticipated student learning difficulties?

What kinds of learning goals are most important (as evidenced in planning or in actual teaching)? Fact oriented? Motivation oriented? Conceptually oriented?

How analytical is the student teacher about student learning (how deep? any theoretical perspective? any evidence of thinking about learning theories discussed last year?)

Does the student listen and respond to students in ways that reflect careful analysis and thoughtfulness about student learning?

What kinds of questions are used to evaluate student learning? Compatible with conceptual change orientation?

What kinds of attitudes does the teacher have toward learning failures (analytical? blame it on student laziness?)

Subject Matter Knowledge Needed to Teach

Does the teacher focus on appropriate conceptual goals in planning and actual teaching?

Is there evidence that the student recognizes the need for additional subject matter knowledge and seeks that out in planning to teach?

Does the student teacher think about the structure of the discipline in deciding what to teach and what to leave out? For example, does the student use concept maps in planning? Does the student take an "all about x" approach, a "what would be the most fun" approach, or a "focus on central concepts" approach in making curriculum decisions?

Does the student teacher think about the functions of the discipline in planning and teaching? For example, does the student teacher emphasize uses of the knowledge being taught, everyday applications, etc.?

THe Process of Learning to Teach

What sources of knowledge does the student rely on in making planning and teaching decisions? For example, does the student think about both the particulars of the classroom and reserach-based knowledge about effective teaching strategies? Or is practical knowledge from the mentor or from experience in the classroom valued over research-based knowledge?

How does the student teacher use suggestions from the mentor teacher? other teachers? from the observer? Are mentor suggestions accepted and used without question, or is there an attempt to link those suggestions with ideas from AL courses? Are observer suggestions accepted and used without question (at least on the days the observer comes), or is there an attempt to think about ways that the particulars of this classroom might require modification of those suggestions?

Is the student valuing conceptual change ideas or are they being rejected as impractical in "real" classrooms?

What AL themes/ideas seem particularly important to the student in the field? Which seem unimportant?

What is the student learning from being in the classroom that seems particularly important to him/her?

What evidence is there that the student is reflective about his/her teaching? that the student sees learning to teach as a lifelong process?

Roles of Various Persons/Experiences in Learning to Teach

What kinds of interactions does the student have with the mentor? Do these interactions complement/contradict/actively support AL themes and goals?

Same questions regarding other people -
- observer,
- AL instructors,
- other AL students (in seminars)
- course instructors from last year (200C, 205C, methods courses)
- other teachers in the mentor's building

In what ways does the student perceive that he/she is getting similar or conflicting messages from these different people?

What kinds of things does the student seem to be learning and valuing from each of these persons? In what ways are each of these persons not influential in their thinking about teaching?

GUIDELINES FOR HELPING STUDENTS
WORK TOWARD PROGRAM GOALS

	Strong indications that students are linking Academic Learning goals with classroom teaching experiences:	Indications that students are not linking Academic Learning program goals with classroom teaching experience:
I. Working with People	A. Relations With Students The student teacher values, respects each student's thinking and actively elicits and considers students' thinking in planning and teaching.	The student teacher is impatient with students who don't "catch on" quickly and blames student learning difficulties on students' lack of effort.
	B. Relations With Mentors The student teacher initiates conversations with the mentor teacher about his/her teaching, asking for help in understanding the successes and failures of lessons.	The student teacher does not initiate conversations with the mentor (or other school personnel) about professional issues, or conversations are limited to "how to" without asking "why".
	C. Relations with 470C Instructor, Other Professionals	
II. Planning for Instruction	A. Comprehension of Student Understanding Seeks and uses information about students' prior knowledge in planning.	Focuses on content-to-be-covered without thinking much about students' prior knowledge and probable learning difficulties; Assumes coverage means learning.
	B. Transformation: Developing Tasks and Activities Selects tasks/activities/questions that will engage student thinking and develop student understanding of of central concepts/ideas - focuses on learning concerns.	Selects tasks/activities/questions because they will keep students orderly and busy, or the students will like them or because that's what comes next in the textbook - focuses on management concerns without serious consideration of learning issues.
	Builds on information about student understanding gained from such tasks for further planning.	Information from evaluation tasks is used mainly for grading purposes - it is not used to shape instruction.
III. Establishing Classroom Climate and Managing Instruction	A. Classroom Climate Teacher and students are actively engaged together in making sense of meaningful concepts and skills.	Teacher and students get along well and classroom is busy but students are satisfied to just get the tasks done, they ignore the content of instruction as much as possible.

	B. Time Management Prepares for classes effectively and efficiently, with an appropriate sense of priorities in deciding what needs to be done.	Spends too much time on some things and not enough on others, leading to inadequate preparation and disorganized classes.
	C. Classroom Organization Organizes and explains rules and procedures that enable classroom to run smoothly and efficiently.	Procedures and rules not adequately worked out or inconsistently enforced. Materials are sometimes not ready or planning incomplete.
	D. Dealing With Minor Disruptions Deals with minor disruptive behavior such as talking unappropriately in a fair and consistent way. Helps students understand rules and learn how to follow them.	Enforcement of rules too lax, inconsistent, or harsh and arbitrary. Fails to help students understand rules and learn to follow them.
	E. Dealing With Severe Behavior Problems Works with students who have severe behavioral or emotional problems in an organized and professional way. Helps them develop and follow through on reasonable plans to overcome their problems.	Falls in to unproductive patterns in dealing with problem students, such as nagging, open frustration, or inconsistent enforcement of rules.
	F. Communication About Content Teacher continually elicits and responds to students' ideas in order to shape and challenge student understanding. Teacher thinks about: How are students making sense of this? Why are they going astray?	Classroom interaction is primarily teacher to student: teacher lectures and asks evaluation questions (Do the students know this or not?)
IV. Command of Subject	A. Understanding Structure of Content Can identify central concepts and skills that are critical for students to understand for a given unit of instruction.	Takes an everything-you-could-possibly-know approach to content coverage - has a difficult time picking out key concepts.
	B. Understanding Functions of Content Understands the subject matter in such a way that applications to everyday/"real world" situations can be made. Can think of questions that will challenge students to apply concepts, skills, ideas to relevant situations.	Student has a fact or formula - oriented understanding of the subject matter. Cannot think up or even recognize good application questions. Cannot see alternate ways to organize subject matter besides the textbook organization.

V. Personal and Professional	A. Concern for Meaningful Learning Genuine concern for meaningful, conceptual learning by students is a goal that drives the student teacher's professional behavior.	The student teacher is conscientious about being prepared daily but focuses more on having something for the class to do than on what the students will learn.
	B. Reflection on Teaching The student teacher reflects carefully on his/her teaching and asks questions of other professionals to work on learning problems the students are having.	The student teacher is satisfied if things are pleasant and orderly and does not puzzle about learning failures of particular students.
	C. Analysis of Teaching The student teacher identifies areas he/she needs to learn more about in order to be an effective teacher and has made efforts to gain that knowledge (whether it be content knowledge, management skills, communication skills, etc.)	The student teacher responds to suggestions from the university observer about areas that he/she needs to learn more about, but does not seek such knowledge on his/her own.
	D. Receptivity to Feedback The student teacher welcomes feedback from mentor teacher and university observer as a learning opportunity.	The student teacher views feedback from the mentor or the university observer primarily as evaluative. ("Am I doing a good job or not?")

Appendix G

Student Assignment Sheets
Describing the 1986-88 set of Field Tasks

Mentor Teacher Project

Program Assessment Report

August, 1988

Appendix G

Student Assignment Sheets

Describing the 1986-88 set of Field Assignments

TERM	COURSE		ASSIGNMENT SHEETS
Fall, 1986	TE 200C	Learning of School Subjects	2 - Learning from Experience 3 - Observing Learning in Action 4 - Reflections on Teaching and Learning
Winter, 1987	TE 205C	Curriculum for Academic Learning	1 - Enacted Curriculum 2 - Text Analysis and Critique 3 - Intended and Enacted Curriculum 4 - Actual Curriculum
Spring, 1987	TE 318C	Elementary Science Methods	Unit Planning and Teaching
	TE 412C	Secondary Methods Courses	Unit Planning and Teaching Weekly Field Visits
Fall, 1987	TE 306C	Elementary Interdisciplinary curriculum	1 - Guided Observation of Beginning Days of School 2 - Observation/Interview of Mentor Teacher about Level 2 and 3 Management 3 - Lesson 1: Integrating Reading and Content and Learning 4 - Lesson 2: Student Writing and the Learning of Content 5 - Unit Planning
Fall, 1987	TE 470C	Secondary Student Teaching	Planning Requirements
Winter, 1988	TE 470C	Elementary Student Teaching	Planning Requirements

TE 200C, Fall Term 1986
Clark, Rosaen, Zeuli, Sykes

Assignment #2

Learning From Experience

Purpose of the Assignment:

Since we have all been in school settings for many years, it is often difficult to shift one's perspective on school learning from that of a student to that of a teacher. The purpose of your first visit to your mentor teacher's classroom, and of this assignment, is to help you become acquainted with this classroom, and reflect on what you experience from the perspective of a teacher.

To assist you in taking on this new perspective toward your experiences in the classroom, we are asking you to try looking at people and events in the classroom the way some researchers do. Educational researchers who use ethnographic techniques try to approach what they observe in classrooms by "making the familiar strange." That is, they try to note details and patterns of action that will help them understand the classroom from the participants' point of view, rather than limiting their interpretion of what they see and hear to their own point of view. They also try to understand details of what they see happen in the classroom in relation to the larger classroom context, so that they tell a unified story of that classroom. Finally, ethnographers try to be sensitive to the ways in which their presence in the setting influences what happens in the setting. This kind of approach to reflecting on your classroom observations and participation can be helpful to you as you gradually take on a teaching role over the next several terms in your mentor teacher's classroom.

The Assignment:

Tell the story of your first visit to your mentor teacher's classroom to your classmates, from your perspective as a prospective teacher, and describe the role you would like to take in this classroom during your remaining visits during this term. The suggested length of your narrative is 3 to 4 pages.

As you tell the story of your visit, include details that describe the following:

a) What kinds of learning experiences (e.g. work, activities, assignments) are available to students in this classroom?

b) What kinds of social relations do you see in the classroom, and how or in what ways do these relations affect the learning experiences in the classroom?

c) What is the overall relationship between teacher and students in this classroom that underlies the learning experiences?

d) What have you learned so far from your mentor teacher about why the classroom has the features you describe in a, b, and c above?

As you describe the role you would like to take on as you continue your visits to the classroom, consider the following questions

e) How can I be of help in this classroom?

f) What can I learn about school learning from this classroom?

g) How can I learn from participating in this classroom?

Due Date: Thursday, October 23, 1986

TE 200C, Fall Term, 1986
Clark, Rosaen, Zeuli, Sykes

Assignment #3
Observing Learning in Action

To Gather Information for this Assignment:

Understanding learning in a classroom setting is an extremely complex process. As we have already noted, the overall organization of the classroom, the teacher's underlying ideas about teaching and learning, the social interaction in the classroom, and the subject matter content are all factors that shape the learner's understanding of subject matter. In addition to all of these factors, there are various characteristics of the learner that influence a student's interpretation of the work he or she must complete in school, and his or her understanding of subject matter content. Some questions a teacher might consider to uncover some of these of these characteristics are:

—What is the student's prior knowledge and experience with the subject matter and with the type of work required? (e.g., How much does the student know about this period of history?; or Has the student ever written an essay before?)

—What is the student's interpretation of what the teacher expects for the activity, task, or assignment?

—In what way(s) does this assignment or task "count" in this classroom? What kind(s) of rewards are available for completing the work, and to what standard?

—What level of effort does the student put forth to complete the activity, task or assignment? Is this level of effort typical?

—What resources or conditions are available to the student to complete the work? (e.g., Is the teacher available to help?; or Is the appropriate reading material readily available for the student to use?)

We want you to try your hand at answering as many of the above questions as possible for a student in your mentor teacher's classroom.

With the help of your mentor teacher, select a student on whom you can focus during some type of "work time" in the classroom. If you can arrange to work with the student in some way as he or she completes the work, that will be to your advantage. Observe the overall classroom situation, observe the student as he or she works, talk with the student informally, and talk with your mentor teacher to learn as much as you can about how the student approaches the work, and how the student interprets the work. Take notes about what the student does and says to use as a future reference. If the student is required to produce some sort of "product" (e.g., written assignment), look at it carefully.

The Assignment:

Write a three to four page essay in which you describe what you think the student has learned from completing the assignment, task, or activity. Include in your description the following:

—Briefly describe the work you observed the student completing, and if possible, how it fits in with what has been happening in the classroom in general.

—Describe any background information you have learned about the student including prior knowledge, prior experience, work habits, past successes or problems in the classroom, etc. Tell how you learned this background information.

—To what extent was the student "successful" in completing the work? Describe the requirements of the assignment and the rewards available in the classroom.

—Describe what you think the student learned from the work (e.g. about subject matter, about completing the task, about himself or herself, or about life in this classroom). On what evidence do you base your inferences?

Due Date: Tuesday, November 25, 1986

TE 200C, Fall Term 1986
Clark, Rosaen, Zeuli, Sykes

Assignment #4
Reflections on Teaching and Learning

Write an essay in which you describe how your thinking about teaching and learning has changed since the beginning of this course. As part of the writing process, review the following:

--Assignments 1, 2, and 3 for this course

--Your journal entries

--What you learned from reading and discussing the biography of a person in your discipline

--What you learned from the visitors to our course (e.g., about the disciplines, and about teaching subject matter)

--Your field visits

--Lectures and discussions

Include in your description:

--A summary of your views on teaching and learning when the course began (e.g. assumptions based on prior knowledge and experience, theories of teaching and learning)

--Describe how your thinking about teaching and learning has changed since the beginning of the course, and what you have read and/or experienced that accounts for the change(s). If your thinking has remained relatively the same, describe what you have read and/or experienced that has reaffirmed your ideas

--Indicate what you think are the most important factors about teaching and learning that you will need to take into account as you continue to work in your mentor teacher's classroom over the next several terms. What will be important for you to attend to, and why?

Suggested length: 3 to 5 pages

Due Date: Thursday, December 4, 1986

NOTE: Be sure to keep a photocopy of your essay for your own use and records. Other students have found this statement of their implicit theories to be a valuable element in their professional portfolio.

TE 205C
Winter, 1987

Anderson, Rosaen
Smith, Sykes

Assignment #1: The Enacted Curriculum

Purpose:

You have already had experiences in your mentor teacher's classroom from your field visits in TE 200C where you have observed the overall classroom routines and the social structure of the classroom, and you have observed learning in action as your mentor teacher or a student teacher taught a lesson. In this course, we will shift our focus to the intended, enacted and actual curriculum in the classroom. For this assignment, we would like you to shift your focus of your observations from the overall classroom and how an individual learner understands a lesson to a focus on the enacted curriculum, or the subject matter that is taught. Specifically, you will observe a lesson in your mentor teacher's classroom and write a description of two aspects of the enacted curriculum:

- —the structure of the subject matter (the main point[s] of the lesson and its place in a larger sequence)
- —how the subject matter is represented in order to help students comprehend it

Arranging Your Observation and Follow-Up Interview:

Contact your mentor teacher as soon as possible to arrange to observe a lesson in one of the four major subject areas: Language, Social Studies, Science or Mathematics. Also allow time for a follow-up interview with the mentor teacher. If you will not be able to schedule a follow-up interview on the same day you observe, you will need to return to the classroom a second time. We have scheduled Field Day #1 for Thursday, January 15, so there will be no class held on that day. If you are unable to arrange your field visit on this day during class time, you will need to make alternate arrangements.

A few notes for elementary majors:

- —It will be most advantageous for elementary majors to observe a lesson in the subject area that corresponds with the discussion section you attend in TE 205C, and continue to observe in this subject area throughout the term.
- —There may be a student teacher teaching in some of the mentor teachers' classrooms instead of the mentor teacher. If so, arrange to observe the student teacher teaching a lesson, and to conduct the follow-up interview with the student teacher. Try to arrange it so that your mentor teacher will be present as well.

As You Observe and Do Your Follow-Up Interview:

As you observe the lesson in your subject area, note details about the areas listed below. After your observation, discuss these areas with your mentor teacher (or the student teacher). You may also want to discuss some of these items in advance with your mentor teacher (perhaps as you schedule your observation) to help you know what to focus on as you observe.

—What topic is the lesson about?

—Specifically, what knowledge about the subject area is the teacher trying to help students understand? What is (are) the main point(s) of the lesson?

—What representations of the main point(s) do students encounter in the lesson? (For example, explicit statements, analogy, metaphor, illustration, examples). Look for representations in teacher presentations, discussions, reading assignments, worksheets, activities, homework assignments, etc.

—How does this knowledge fit within the curriculum in this subject area?

The Written Assignment:

Write a description of the subject matter knowledge that is taught in the lesson. Include in your description the following:

a) Give a brief description of the lesson you observed. Tell briefly what the lesson was about, and how it was carried out.

b) Specifically, what subject matter knowledge did the teacher try to help students understand? What was (were) the main point(s) of the lesson?

c) How does the subject matter that was taught (the main point[s] of the lesson) fit with the larger sequence of what is taught about the subject?

(Note: for (b) and (c) you may try using a concept map or other graphic representations to show what was taught and how it fits within a larger sequence. If you do so, include a brief written explanation.)

d) Wilson and Shulman discuss subject matter representations that teachers use to help students understand subject matter content. What representations of the main point(s) of the lesson does the teacher use to help students understand it?

e) What questions do you still have about any of the aspects of the subject matter you have discussed above? What can you do to begin to find answers to those questions?

Suggested length: 3 to 5 pages, typed (double spaced)

Due Date: Thursday, January 22, 1987

Note: Please make TWO COPIES of your finished assignment. Hand one in to your discussion section leader during class. Take the second copy to your mentor teacher on Field Day #2 (January 29, 1987).

TE 205C
Winter, 1987

Anderson, Smith,
Rosaen, Sykes

Assignment #2: Text Analysis and Critique

Purpose:

Textbooks are materials you will most likely use extensively when you teach, and the better you are at critically appraising them, the more useful they will be to you as a teacher, and to your students as learners. The purpose of this assignment is to provide an opportunity for you to closely examine the content of a textbook in your subject area, so that you can develop an understanding of the rationale and organization of the text, and critically appraise the usefulness of the text as a teaching tool.

Finding a Text:

On Field Day 1 (February 15), obtain the teacher's edition of a text from your mentor teacher's classroom that you will analyze and critique . The teacher's edition contains greater detail about the purpose, structure and rationale than the students' edition, so it will be more helpful to you as you complete this assignment. If you are unable to take a copy of your mentor teacher's edition of a textbook with you, it is quite likely you will find a copy of the same text in the Instructional Resources Center on the first floor of Erickson Hall. Or you may need to photocopy a portion of the text and return it to your mentor teacher.

Studying the Text:

a) Take some time to become familiar with the overall organization of the text. Review the chapter headings, subheadings, the format (e.g., Is it consistent from one chapter to another? Does it include assignments in addition to information?), and the general content of the text.

b) Select a portion of the text to analyze and critique. This will vary according to the subject of the text you are examining, the grade level, and the organization of the text. If the chapters are a manageable length (10 - 15 pages) you may select the entire chapter. If they are longer, you may select a portion of the chapter, but be careful not to select too small a portion to be able to comprehend the subject matter that is included.

c) Read the chapter. (If you have selected a portion of the chapter, read the entire chapter so you understand how the section fits with the whole chapter.) If assignments are given, try completing some.

d) Read the chapter again, and analyze the content, keeping in mind the aspects you are to include in your description.

The Written Assignment:

Write an analysis and critique of the portion of the text you studied. Include in your written assignment the following:

a) Describe the intended curriculum as it is developed in the text in terms of:

—structure: develop a way of representing the subject matter to show how it is organized, including main concepts and related ideas. You may use a concept map, outline, table, chart, flow chart to represent the subject matter, and should also provide a written explanation of the representation you provide.

—purpose: what are the stated or implicit the purposes for teaching or learning the subject matter? Why is the subject matter worth learning for the students here and now? In what way(s) does it contribute to students becoming literate adults?

—student development: what information is given in the text about what students already know or understand about the subject matter, and what they need to know or understand?

b) Make a critical appraisal of the text, using specific examples to illustrate your ideas, in terms of:

—structure: does the organization of the text help students identify main concepts and their relationships to each other? Does the text help students see how this chapter is related to other chapters in the text? Does the teacher's guide help the teacher to focus on the main points and the connections among main points?

—purpose: To what extent does the text make explicit purposes for learning? Is the subject matter, as it is structured, worth learning? Explain.

—student development: In what ways does the text help students, or the teacher, build new knowledge out of prior knowledge?

Suggested length: 4 to 6 pages, typed (double spaced)

Due Date: Tuesday, February 3, 1987

Note: Please make two copies of your finished assignment. Hand one copy in to your discussion section leader during class. Take the second copy to your mentor teacher on Field Day #3.

TE 205C
Winter, 1987

Anderson, Rosaen,
Smith, Sykes

Assignment #3: Intended and Enacted Curriculum

Purpose:

For your first field visit this term, and for your first written assignment, you wrote a description of the enacted curriculum based on a lesson you observed. At that time, you focused on describing the subject matter that was taught. For this assignment, you will again observe a lesson or a series of lessons in your subject area to examine and write a description of:

--how the mentor teacher intends to transform or represent knowledge

--the enacted curriculum: subject matter that is taught

--the interaction between the intended curriculum and the enacted curriculum

Planning Your Observations and Interviews:

We have scheduled two field days (January 29 and February 5) to help you schedule at least two visits to your mentor teacher's classroom to complete this assignment. If it is not possible to arrange your observations and interviews on Field Days 2 and 3, you will need to arrange alternate dates and times. Set up your 2 visits to the field so you can accomplish the following:

--Identify a lesson or series of lessons you will observe in your subject area. This should be the same subject area that you focus on in your TE205C discussion group .

--Interview your mentor teacher (along with the student teacher in the classroom if the mentor teacher is not currently teaching) about the structure and purpose of the subject matter he or she intends to teach in one lesson or a series of lessons. How does he or she intend to represent the subject matter for the lessons(s), and why will it been represented in that manner? What information about student development influenced decisions the teacher made? What is his/her purpose in teaching the lesson(s)? Obtain copies of materials that will be used.

--Observe the lesson or series of lessons to gather information about the manner in which the subject matter was actually taught, and the contextual factors in the classroom that shaped the way the lesson(s) progressed. What were the main points of the lesson, and generally, how did it go? How did the students respond to the lessons(s), and what kind of understanding of the subject matter can you find evidence of? Were changes made along the way in how the lesson was implemented, and if so, for what reasons?

--If it fits with the mentor teacher's plans, you may also negotiate to participate in teaching part of the lesson(s) if you wish. This might involve assisting in the classroom, working with a small group of students, giving a short presentation, preparing materials, or any other ideas you and your mentor teachers have about how you might contribute to teaching the lesson(s).

The Written Assignment:

Write a description in which you describe how your mentor teacher constructed this piece of curriculum (a lesson or series of lessons), and analyze the interaction between the intended and enacted curriculum. Divide your description into three parts:

a) Give a brief account of planning and teaching:

Describe the structure of the subject matter. What were the main ideas and how did the teacher intend to represent the subject matter to students to help them understand?

What was the teacher's purpose for teaching it?

What information about student development did the teacher take into account while planning the lesson(s)?

How did the teacher intend to assess student understanding?

Describe the lesson(s). What were the main points, and how was the lesson carried out?

b) Compare and contrast the intended and enacted curriculum:

Were the intended main ideas addressed? How? Were they emphasized? Were other ideas emphasized? Use specific examples to explain your ideas.

Were the intended representations used? Were other representations used? If so, what were they? Use specific examples to explain your ideas.

c) Analyze the differences between the intended and enacted curriculum:

Summarize the changes that occured.

How do you account for the changes? Reflect on what happened during the lesson, what the teacher tells you about how s/he thinks the lesson went, and information about student development to help you infer why the changes were made.

Suggested length: 4 to 5 pages

Due Date: Tuesday, February 17, 1987

Note: Please make two copies of your finished assignment. Hand one in to your discussion section leader during class. Take the second copy to your mentor teacher on Field Day #4 on February 19, 1987.

TE 205C
Winter, 1987

Anderson, Smith,
Rosaen, Sykes

Assignment #4: The Actual Curriculum

Purpose:

The purpose of your final field visit and your final written assignment is to provide the opportunity for you to assess the actual curriculum: how students understand the enacted curriculum. You will interpret assignments and/or tests completed by students in your mentor teacher's classroom and interview selected students to examine the actual curriculum for the same lesson(s) you studied for Assignment #3.

Planning Your Field Visit:

Identify with your mentor teacher (along with the student teacher if the mentor teacher did not teach the lesson[s] you observed) at least one written assignment or test that was part of the lesson(s) you studied for Assignment #3.

Choose two students whose completed assignments or tests you can study, and with whom you can conduct a clinical interview to find out more about their understanding of the subject matter that was taught. You may already have students in mind as a result of your previous observations. You may find it helpful to identify two students who contrast in some way (e.g., grades, motivation, level of class participation, interest in the subject matter).

We have scheduled Field Day #4 for February 19, 1987 to enable you to visit your mentor's classroom to collect the written work you will need, discuss with your mentor teacher any questions about the work or the students you will interview, and to conduct your clinical interviews. Try to allow at least one and one-half hours for your visit. You may find the need to return a second time to discuss unanswered questions with the students whom you interview, so you may want to keep this in mind in budgeting your time for this assignment.

Preparing Your Clinical Interview:

Prepare a clinical interview to conduct with two students to find out how the students understand the subject matter that was taught in the lesson(s) you observed. Use the guidelines given in class to prepare your interview. The interview will be an additional source of information that will supplement what you learned from your observation of the lesson and from what you will learn from the written assignment or test you will evaluate.

The Written Assignment:

Compare and contrast two students' understanding of the enacted curriculum (for the lesson you observed for Assignment #3). Use pseudonyms in your description. Include in your description the following:

a) Provide three descriptions of the subject matter:

Develop a way to graphically represent the subject matter from three viewpoints:

--the enacted curriculum
--the way student #1 understands the subject matter
--the way student #2 understands the subject matter

From each viewpoint, show how the subject matter is organized, including main concepts and related ideas. You may use a concept map, chart, flow chart, outline or any other means of showing parallel representation of these three viewpoints.

Accompany each representation with a written explanation. Include pertinent information from your observation, from studying the students' written work, from what you have learned from the teacher about the students' development, and from your clinical interviews. If you include student work, specifically discuss it in your description.

b) Compare and contrast the two students' understanding of the subject matter:

How are the understandings of the two students similar and different? Give specific examples.

How do you account for the differences in understanding? For example, consider the enacted curriculum, or information about individual student development. Give specific examples.

Suggested Length: 4 to 5 pages

Due Date: Thursday, February 26, 1987

Note: Please make two copies of your finished assignment and bring them to class. One will be handed in to your discussion section leader, who will take responsibility for mailing your second copy to your mentor teacher.

TE318C Unit Planning
& Teaching
Elementary Science
Methods

TE 318C TEACHING ELEMENTARY AND MIDDLE SCHOOL SCIENCE
Glenn D. Berkheimer
Science Unit Plan and Field Assignment
Spring 1988

The development of a Science Unit Plan and the teaching of four lessons from it are the most important assignments in this course. The format for the unit plan will be the same as the one you used for the Social Studies unit last term except it will be expanded to include evaluation of student learning. You will also have the opportunity to teach four lessons from the unit plan and reflect on that experience.

You should meet with your mentor as soon as possible to select a science topic for the unit. Select a topic that is an integral part of your mentor's science program so that it might be possible to teach this unit during your student teaching. This would give you the opportunity to teach the entire unit as well as the four lessons for this course. The more units you have planned before Winter term 1989, the better prepared you will be for student teaching.

Start your planning process by looking at a unit or chapter in a student text or teacher's guide, analyzing the way the content is structured and the suggested activities and objectives. You may decide to build your unit closely around the textbook organization, and that is fine. We do not expect you to create this unit from scratch. The important thing is to have a conceptually coherent unit that takes into account the students' prior knowledge.

I. The central question or problem that will serve as the focus for the unit.

Write a sentence or question that describes the essence of what the unit is about. This central question should be written in terms that your students could understand before they start the unit, and it should point out something important (high literacy) that students will learn to do as a result of the unit.

Describe in a paragraph the main ideas that you will develop in order to help students answer the central question. What is the central idea of the unit? The overall goals?

II. Structure of the subject matter content of your unit.

You will identify the main concepts/terms in your unit and describe them in terms of their relationship to each other by developing:

A. A list of key concepts, terms, and relationships.
B. Define concepts, terms and relationships in words appropriate for the specific grade level.
C. Represent the structure for the unit by developing a concept map.

III. Functions of your unit

Why is this content important to teach? What does it enable students to do? You will address these questions by writing:

A. A paragraph about why this content is important for students (and/or literate adults) to understand. Refer to the list of "Functions of High Literacy" for science discussed in TE 205C.

B. A list of objectives or purposes. These should be stated in behavioral terms (e.g. "the students will be able to describe, explain, predict, control" etc. rather than non-behavioral objectives such as "the students will learn about, understand, be aware of," etc). The terms listed on your "Functions of High Literacy" handout from TE 205C can help guide you in stating objectives.

C. Write pre and post assessment instruments that address the content of the four lessons that you will teach. In addition you will write 3-5 post assessment questions for each lesson that you teach. On a separate page write answers to each question which indicates how you would want students to answer the question.

D. A list of activities, teaching episodes, etc. that may become elements of lessons.

IV. Student Development

Provide a list, chart, or written description of anticipated student prior knowledge, potential student difficulties, and possible student misconceptions relative to your unit. This could be organized as a preconception/goal conception chart. Your pretest data, reading, and analyses of the content are sources of information for this chart.

V. Daily lesson plans

The unit must have at least four lessons. You will write out four fully-developed lesson plans.

Be realistic in terms of your time limitations, and be selective in terms of the quantity of material that you expect to cover in each lesson. Remember that each lesson should be a step in helping students develop a meaningful answer to your central question.

The four fully-developed lessons should include:

A. A statement of objective(s) being addressed and how the lesson relates to the central question.

B. A list of materials needed.

C. A chronological description of the lesson. This should include an introduction to the lesson (setting of purpose, linking the lesson to earlier lessons, providing an advance organizer, or motivating students to learn); a list of procedures, activities, exercises, discussion questions, etc. used in the development of the lesson; a closing summary and an assessment of student understanding.

VI. Evaluation of Student Learning. As part of your unit teaching you will be assessing student learning both as you teach and in some kind of quiz or test. In evaluating student learning, think back to your preassessment. Where did the students start? What progress was made? What ideas still seem difficult for the students? In discussing the results of your test, give examples of the types of answers you got and the number of students making each type of answer. Discuss how you used evidence from your test or from other work to decide what your students had learned well and what ideas were still posing difficulties for them. Try to describe changes in your students' thinking and understanding rather than "They knew this, but they didn't know that." Contrast your "intended" curriculum with what students actually learned. Were you surprised by any of the results? Did they give you any insights into how you would teach the unit another time?

You could also supplement your assessment of student learning with informal interviews with students after the unit teaching week. Ask them to tell you what they thought the unit was all about, what they learned from different activities you did, what was easy or difficult for them. This might give you some interesting insights to the unit from your students' perpectives.

VII. Reflections and Analysis of the Unit. This section should include:

a. Teacher written feedback on your teaching.

b. Daily reflective writing for each day of the unit using the same areas on your mentor's feedback form. You might write about ways in which you deviated from your lesson plan, particular things students said that you found interesting, things that pleased you, things that bothered you, how you are feeling in your new role as teacher, etc. You might sometimes explore a connection between something we've talked about in class and something in your classroom. After writing, read through what you have written and underline key words, phrases, or ideas that seem most interesting to you.

c. Analysis of your teaching and description of what you've learned. This section should be a thoughtful essay that presents your ideas clearly and honestly. This section needs to be more organized than the daily reflections. It should include (not necessarily in this order):

-description of any changes you made in your daily plans as you taught and why.

-strong and weak points of your planning and teaching

-specific suggestions for improvement in the content and conceptual development of the unit

-management lessons learned and how you will incorporate social control strategies in future plans.

-places where you see links between what you've learned in TE 318C methods, TE 200C, TE 205C with your unit teaching experiences (specific issues raised in A.L. courses and readings that seemed relevant to your unit?)

-analysis of ideas you tried to incorporate into your unit from TE 318; how might you explore these ideas further during student teaching?

-description of things you need to learn more about before or during student teaching; discussion of ways in which you can be working on some of these prior to or during student teaching.

While you are working on your lesson plans, think about the kinds of things that you would have to do in order to help students through meaningful conceptual change. You should also be concerned about issues related to social control and how you could address them in your lesson. Remember that some of the major goals of the sciences have to do with educating students to describe, predict, explain, and control the phenomena in their everyday environment.

ACADEMIC LEARNING UNIT PLAN ASSIGNMENT

Spring, 1987

The most important assignment in TE 412C and in your methods courses this spring will be developing and teaching a unit in your mentor teacher's classroom. The actual teaching should take about five class days around the week of May 18. However, you will be doing work associated with developing, evaluating, and reflecting on the unit throughout the term. You will be expected to teach one of your mentor teacher's classes; your mentor teacher will continue to teach the rest.

Your goal in teaching this unit is to help the students in your class achieve "an attainable form of high literacy" for the topic that you are teaching. In other words, you want them to understand the topic, not just to memorize. You will not achieve this goal completely; teachers never do. In planning, teaching, and reflecting on the unit, you will have a chance to engage in each of the activities that Wilson and Shulman (150 Ways of Knowing) discussed in their paper: comprehension, transformation, instruction, evaluation, reflection, and new comprehension.

In this course you will be asked to write about your thinking as you go through these activities in great detail, much more detail than is possible when you are actually teaching. We hope that this detailed writing will serve two purposes. First, it will help you to clarify your thinking as you go through difficult activities that you are trying to do for the first time. Second, it will allow you to share your thinking with your course instructors and your mentor teacher so that they can help you with comments and criticism.

Developing, writing, and teaching your unit will be a multi-step process. The most important steps are outlined below. As you go through these steps, you should be reflecting on ways in which these steps are useful to you in planning and how you might work through similar steps in your own planning as a teacher.

I. Defining and understanding the content of your unit (comprehension)

Your first task is to define the content that you will teach and to try to understand it as thoroughly as possible. We will ask you to do this by writing a content-focused introduction to your unit plan that includes the following parts:

A. Central focus or question. Write a single sentence or question that describes the essence of what the unit is about. This central question should be written in terms that your students could understand before they start the unit, and it should point out something important that students will learn to do as a result of the unit.

B. Structure of unit content. What are the main points of this unit? How are they related to each other? How are they related to other important ideas in the discipline? Answer these questions by developing a concept map or some

TE412C Unit Planning
& Teaching in
Secondary Methods
Courses

ACADEMIC LEARNING UNIT PLAN ASSIGNMENT

Spring, 1987

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B. Structure of unit content. What are the main points of this unit? How are they related to each other? How are they related to other important ideas in the discipline? Answer these questions by developing a concept map or some other graphic representation of the unit content and by writing a brief essay discussing the main points and their relationships.

C. Function or purpose of unit content. What worthwhile activities will this unit help students to get better at? Write a set of objectives describing what students will learn to do (or get better at doing) as a result of studying this unit. These objectives should describe activities that are worth doing in the real world, not just for the purposes of passing a course. Ideally, the objectives should describe "functions of high literacy" that were discussed in TE 205C. The central question of the unit will probably be associated with the most difficult or inclusive of these objectives.

Due date for Part I: April 16

II. Making Content Accessible to Students (Transformation)

Successful teaching for understanding involves more than telling students what you know, even if you understand the unit content thoroughly and you tell them in a clear and well-organized manner. Students can develop true understanding only through a process of conceptual change, in which they build on, reorganize, and rethink their own prior knowledge and beliefs. For most students, this process of conceptual change can take place only if you transform your content knowledge, changing it from something that makes sense to you into something that helps students "build bridges" from what they know now to what they need to know.

As you try to transform your content knowledge, we will ask you to consider and to write about the following issues:

A. Student prior knowledge. What do your students know or believe (correctly or incorrectly) about the topic that you will be studying before the unit starts? You will conduct a clinical interview or some other pre-assessment that reveals something about students' prior knowledge: conceptual knowledge, strategies for solving important problems or for building knowledge, or beliefs about themselves and the subject that they are studying.

B. Text and resource analysis and critique. You will analyze the portion of your mentor's textbook relevant to your teaching unit, focusing on how the text organizes ideas as well as on ways in which the text may be problematic for students. You will analyze in what ways the text can be helpful to you in the unit teaching and what gaps it leaves that you will need to address.

After analyzing the textbook, you will look at other resources that could help you in planning and/or teaching the unit (other textbooks, tradebooks, laboratory activities for a science class, manipulative activities for a math class, original sources for a history class, A-V resources such as overhead transparencies). Analyze ways in which other resources are different from the text, how they might help fill gaps left by the textbook, and what they will contribute to student learning.

C. Bringing the pieces together. At this point you will have worked on several separate parts of the unit plan that need to be coordinated: Central question, objectives, structure of unit content, functions of unit content. You will try to bring these pieces together by doing a task analysis of the central question. What will students need to know to answer the central question well? How do they have to use that knowledge? What change in their thinking will be involved in learning that?

As you are working on this part of the unit plan, you will learn some things that will make you rethink Part I. You may discover that your students already know how to do some of the tasks you described in your objectives, or (more likely) that they have difficulties that you had never even considered. Therefore, you will probably need to revise Part I in the light of what you have learned while doing Part II.

Due date for Part II and revised Part I: April 30

III. Developing Teaching Strategies (Instruction)

The next step in unit planning is to develop specific lesson plans that will help your students through the process of conceptual change. We will discuss a variety of general and specific strategies for accomplishing this goal, and we will expect you to describe your lesson plans in a way that makes clear how you are using those strategies.

We will also expect you to work closely with your mentor teacher to develop daily lesson plans in a format that fits well in your mentor teacher's classroom. You will also learn about your mentor teacher's routines, procedures, and rules for managing students, student work, and materials.

As you develop your lesson plans, you may again find that you need to revise previous parts of your unit plan.

Due date for Part III and revisions (if necessary) of Parts I and II: May 7

Target dates for unit teaching: May 18-22

IV. Evaluation of Student Learning

During the unit you will need to evaluate your students' learning for two purposes. First, you will need to assign grades. Second, you will need to decide how well your teaching strategies are working. Therefore you will need to develop and include in your unit plan one or more formal or informal means of evaluation, and you will need to write about the results of your evaluation.

V. Reflection and New Comprehension

This assignment is intended to be a learning experience, and you will probably see many ways in which you would do things differently if you were doing the unit over again. Therefore, we will ask you to reflect on your teaching after you have completed the unit, writing about what you have learned and what would be different about your understanding of the unit content, your plans, or your teaching the next time you taught this unit.

We will also ask you to think about the unit planning process as it relates to teaching in general. What have you learned that will carry over to your planning and teaching next fall? In what ways is your experience on this unit unlike what you will be doing in the future?

Due date for all five parts of unit report: May 28

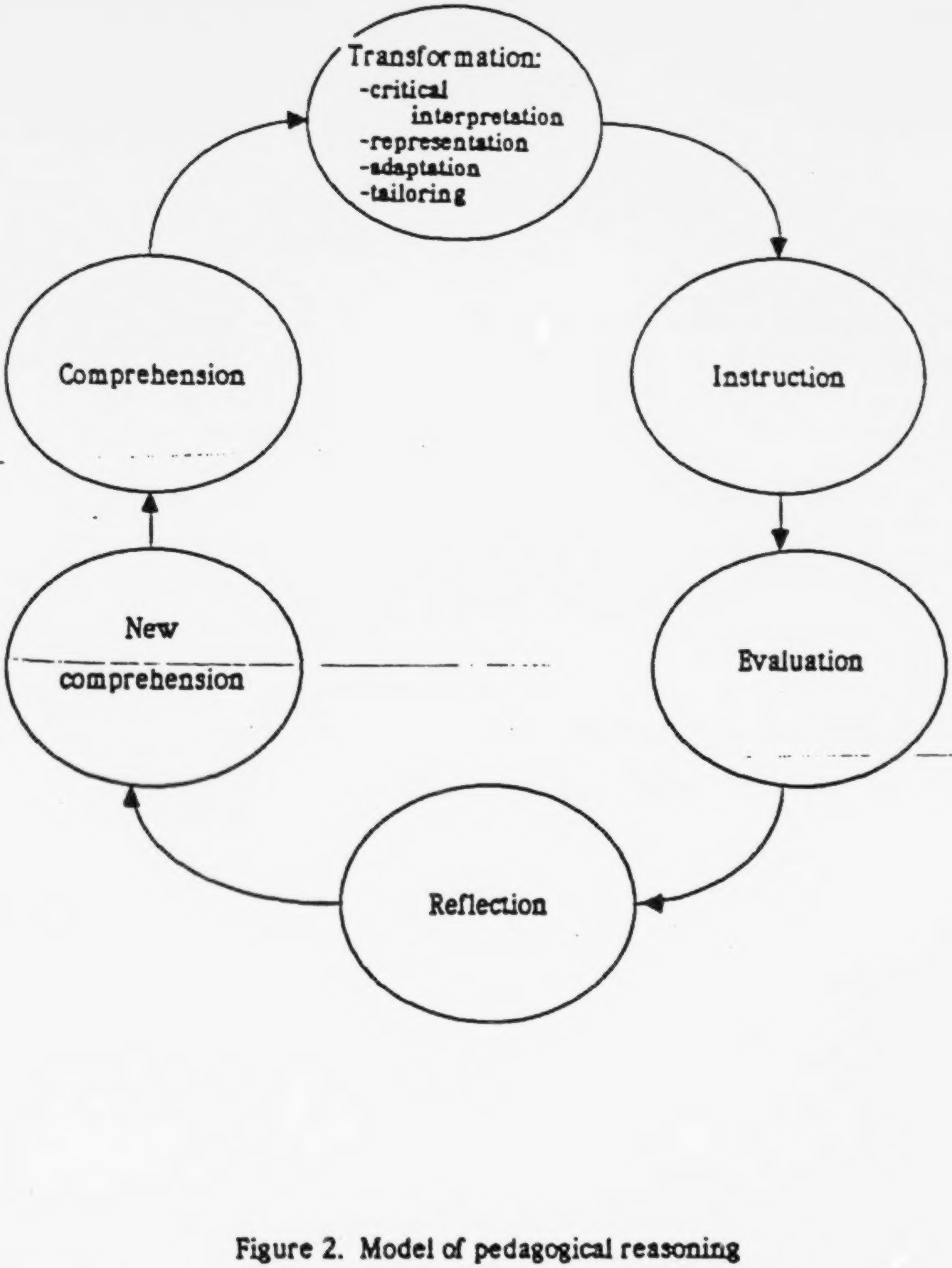

Figure 2. Model of pedagogical reasoning

TE412C Weekly Field Visits
for Secondary
Methods

K. Roth

Suggested Ideas for Use of Field Time

TE 412C

Spring, 1987

Observations and Discussions with Your Mentor Teacher

_____Take field notes of a lesson or part of a lesson using the 2-column format we tried in class (observations/inferences, questions, judgments)

_____Use ideas from your field notes to start a discussion with your mentor - ask questions!

_____Observe a lesson for a special purpose. For example, you might focus on time use and study how long it takes to get the class settled, to go over homework problems, etc. Most beginners have a difficult time judging how long things will take. Observations could also focus on a particular student or on how the teacher responds to student questions. A requirement later in the course is to focus one observation on classroom management issues. Before doing this you should talk to your mentor so that you have some ideas of what to look for. Remember that field notes will provide something to reflect on later. This works much better than vague memories and impressions.

_____Talk to your mentor about planning - both daily and longer term. Think about ways your planning may have to be different than your mentor's because you are just beginning. Get a feel for the overall plans for the rest of the year.

_____Discuss with your mentor procedures you might use for writing daily lesson plans.

_____Tell your mentor about things you are reading about, talking about in your TE classes. Raise questions about these ideas so that your mentor can help you think about how the ideas could be useful/modified in this setting.

_____Interview (formally or informally) a student (or students) to find out about their understandings of the lessons, their learning strategies, their other experiences in school, their attitudes toward school, their out-of-school activities, etc.

_____Follow some of your students to their next class to get a better feel of what their day is like.

_____Talk to your mentor about testing and grading.

_____Talk to your mentor about classroom management issues.
This will be required later in the term. Find out about handling of discipline problems, avoiding discipline problems, procedures for managing materials, activities, small group work, etc. Also find out about procedures for taking up work, checking work, etc.

_____Observe another teacher in the building. To get the most out of such an experience, it is good to have a specific purpose in mind (to look at a special teaching strategy, to observe a different style of classroom management, etc.). Once again, field notes will help!

_____Do something thoughtful for your mentor to show your appreciation for his/her help.

Instructional Support

_____Assist students individually with their work.
Work individually with a student who has been absent.
Wander around the room and answer student questions when they are working independently or in small groups.
Help a student individually (or a small group) that the mentor teacher has identified as needing special help of some sort.

_____Lead a small group discussion.

_____Take responsibility for leading the whole class for a portion of an hour (even 5 minutes!). For example, you could lead the class in going over homework problems or questions.

_____Walk around the room and look over students' shoulders as they work. Try to ask them questions to push their thinking or to help them clarify what they are writing.

_____Read all materials that students are currently using. Do some outside reading about the topic they are studying. Investigate any school curriculum guides in your subject area.

_____Check homework or quiz papers.

_____Make up possible test or quiz questions for your mentor to react to or possibly use.

_____Read student papers and write comments to the students in pencil before your teacher reads the papers.

_____Help the teacher in planning. You might construct worksheets, practice problems, a learning game, ideas for writing or reading assignments, etc.

_____Make up a reading guide for students to use with a homework assignment.

_____Help the teacher run off dittos, gather or set up laboratory or other kinds of materials.

_____Prepare some sort of visual aid (overhead, drawing on a ditto, etc.) that you or the mentor present to students.

_____Help the teacher make arrangments for a guest speaker or a field trip or other special event coming up.

_____Initiate dialogue journal writing with a student (or with your teacher if he/she has time). In responding to the student's writing, ask questions that will help you learn about his/her interests, attitudes toward school and learning. The student could also fill you in on what is going on in the class between your visits.

_____Bring in extra resource information from the library or other sources to supplement what students are doing in class.

Gathering Survival Information (also known as the nitty gritty!)

_____Find out about school policies and procedures: hall passes, procedures for ordering/checking out audio-visual materials and equipment, attendance taking and reporting, use of xerox or ditto machines, detention policies, etc.

_____Talk to people who provide school support services: secretary, media lab, computer labs, library, counselors, reading consultant, other specialists.

_____Find out about district level support services.

_____Talk to the principal or vice principal about your activities this term and your reactions to being in the school.

_____Learn the names of the students in the class you will teach.

_____Meet other teachers in your building, especially those in your subject area (they may be helpful sources of ideas, support, or materials at some point).

_____Learn how to use audio-visual equipment.

_____Find out about extracurricular activities at the school, especially those your teacher is involved in.

_____Drive around the neighborhood (if possible have your mentor take you on a guided tour).

_____Attend a staff meeting or find out what goes on at staff meetings.

_____Find out what inservice and professional development opportunities teachers have at this school.

_____Find out how teachers communicate with parents. If appropriate, draft a notice to parents about an upcoming event.

_____Investigate the professional journals available at the school.

_____Find out about teachers' budgets for instructional supplies.

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_____

_____

_____

TE306C
Fall 1987
E. Smith

Field Assignment 1
Guided Observation of Beginning Days of School

Rationale

One of the major themes of TE306C is classroom management. Our work will involve your learning more about your mentor teacher's classroom management. In coming to understand this, the first few days of school are especially important. First of all, the management is more visible at this time. The expectations and procedures which make the classroom "run" will be receiving more explicit attention during this period of time. Later on in the year, much of the management may seem to occur almost automatically. To develop an understanding of the nature of classroom management and to prepare you to take on more responsibility it will be important for you to understand how your mentor teacher's classroom works.

Secondly, it is important to understand how the procedures and expectations come to be established. This will be important when you start off the year with a class of your own, but it will also be important for when you take over during student teaching. You will need to do some management teaching to reestablish familiar patterns as yours and to set up any new patterns that you want to establish.

All this is presented as a rationale for the first field assignment for TE306C, guided observation of the beginning days of school. I should add that this assignment has been suggested by several of the mentor teachers and previous Academic Learning program students.

Schedule

The field assignment involves observation of three full days of school. The first three days of school for your mentor teacher's class are preferable. If this is not possible for you or if your mentor teacher prefers an alternative, three other days can be scheduled as near the beginning of the year as possible, with the three days of MSU registration being satisfactory. Although preferable, the days need not be consecutive. You should, however, observe full days.

Plan to arrive at school before school starts, at about the same time that your mentor teacher arrives, and stay for the entire school day. Stay after school to see how your teacher uses that time. Try to be helpful, and remeber, THIS IS A VERY BUSY TIME FOR YOUR TEACHER. S/he will probably not be able to devote very much time with you.

Details about the assignment and guidelines for carrying it out are provided in the following pages.

Framework for Thinking About Management

> "....classroom management is primarily a matter of preventing problems before they occur, not the ability to deal with them after they occur. (Good and Brophy, p. 166)

Classroom management is often viewed in terms of discipline, or dealing with misbehavior. While this is an important aspect of management, an overemphasis on this aspect is likely to be counter productive, creating as many problems as it solves. At the core of effective management is the organization of classroom activity so as to minimize the opportunities for misbehavior and optimizing the opportunities for engaging in productive learning activities.

We will distinguish three levels of management:

1. Organization and procedures,
2. Dealing with routine inappropriate behavior
3. Dealing with more severe behavior problems

The primary focus of field assignment 1 will be on level 1. Later in the school year, this level of management is not readily apparent. The classroom may seem to run itself. However, this doesn't just happen. During the first few weeks of school the teacher establishes certain patterns of behavior with the students for various aspects of classroom activity. The students come to understand the teacher's expectations and what they will be accountable for. These patterns, often referred to in the management literature as routines, are maintained through some form of monitoring and consistent exercise of accountability. Understanding how a particular classroom works is to a large extent understanding such routines.

The following are aspects of classroom activity for which routines might be usefully established (theses lists are not exhaustive):

Procedural routines
- Entry and beginning of the day's activity
- Distribution of materials
- Movement of students from one area to another (within and/or beyond the classroom)
- Transition from one lesson or activity to a new one (Including the teacher gaining the students' attention to begin the new activity).

Instructional routines
- Independent individual or group work for the class while the teacher works with a small group
- Small group activities (where all the groups are working at the same time under the teacher's supervision)
- Whole class discussion/presentation
- Whole class individual work

Guidelines for Observation, Analysis and Documentation

There is much going on during the first few days of school. It will be impossible for you to observe and think about everything. Although you will undoubtedly observe other interesting and important aspects of the situation, the establishment of routines and expectations should serve as a central focus. Try to map out the flow of activity for the day. It will be useful for you to note what the teacher does before and after school as well as what goes on during the school day itself.

Select at least two procedural routines and two instructional routines for more detailed analysis. Use the following set of questions as a guide for your observations and analysis:

What is the pattern of activity?
What are the expectations for student accomplishment?
What are the expectations for student behavior?
How does the teacher help the students learn to fulfill these expectations?
How does the teacher maintain student accountability?
  How does the teacher monitor student behavior and accomplishment?
  What are the consequences of students fulfilling or failing to fulfill the teacher's expectations?

A set of analysis forms (blue) including the above questions will be provided for you to use in documenting your analysis. Before you leave each day, turn in to your mentor teacher a copy of your work on each selected routine. This will give her/him an opportunity to review and reflect on your analysis and prepare written or oral feedback. You should also arrange a mutually satisfactory time to confer with your mentor teacher for at least a half an hour near the end of (or after) the observation period. KEEP IN MIND THAT THIS IS AN EXTREMELY BUSY TIME FOR THE MENTOR TEACHERS. YOU SHOULD NOT EXPECT THEM TO HAVE BLOCKS OF TIME TO DEVOTE TO YOU BEYOND THE ONE JUST MENTIONED. PLEASE BE SENSITIVE TO THIS SITUATION.

Your analysis should develop over the three days of observation, so you will add to, revise and/or work up new forms as you go along. Save these forms as well as the teacher's feedback forms (pink) as documentation of your work. You should also keep a journal in which you document other aspects of your observations, your reactions and thoughts about how this work relates to your own future teaching, etc. You might find it useful to think of the forms as structured journal entries rather formal reports. That is, use them to develop your own thinking, not just to report to the mentor teacher and I. Feel free to mark them up, add notes, arrows,etc.

You may find that there is much more to observe and say about how the the teacher helps the students learn the procedures and expectations than there is about maintaining accountability at this point in time. You will have opportunity to elaborate on the accountability part of the analysis at a later time.

You should also review the management articles from TE318C (by Linda Anderson and her colleagues) and try to relate them to what you are observing. We will be using them in TE306C as well.

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Field Assignment 2 - Observation/Interview of Mentor Teacher About Level 2 & 3 Management

We will distinguish three levels of management:

1. Classroom organization and procedures,
2. Dealing with routine cooperation problems, and
3. Dealing with more severe behavior problems.

Field assignment 1 (Guided observation of the beginning days of school) focused on level 1. For field assignment 2 you will observe your mentor teacher at least once focusing on level 2 management and interview her/him concerning level 2 and level 3 management practices. You will also prepare a written report presenting your analysis of your mentor teacher's classroom mangement practices (All three levels).

Dealing with routine cooperation problems

Even in the most well organized classrooms, there are occasional instances of inappropriate behavior. Most such behavior can be dealt with effectively through short term actions, usually at the time of the incident. This is the second level of management -- handling routine disruptive behavior.

Most teachers have a hierarchy of responses for dealing with routine cooperation problems using subtle, nondisruptive responses most of the time and resorting to more forceful (but more disruptive) ones only when necessary. The following hierarchy illustrates commonly used responses.

Nondisruptive
- eye contact
- touch and/or gesture
- physical proximity
- asking for responses
- feedback and encouragement at a natural break in the lesson

Interventions
- saying students name
- reminder about rule
- demand for appropriate behavior

Punishment or threat of punishment
- formal warning (name on board), etc.
- assigning of negative points or loss of positive points toward some consequence
- loss of privilege
- detention

Assignment

Try to develop a description of your mentor/cooperating teacher's practices for handling routine cooperation problems. Use the following questions as a guide:

What "rules" are made explicit in your classroom? What implicit rules are enforced?

Use your observation(s) and interiew to find out how your mentor teacher handles:

- failure of students to be quiet and attentive at the beginning of a lesson
- lack of attention (nondisruptive) during whole class instruction
- talking or other disruptive behavior during whole class instruction
- failure of a student to complete required work during an allocated work time or at a due date.

Can you identify a response hierarchy for your mentor/cooperating teacher?

How often are the various responses exercised?

How well does this system seem to be working?

Dealing with Severe Behavior Problems

Occasionally teachers encounter students who do not respond to the usual measures for gaining cooperation. They continue to engage in disruptive behaviors and/or engage in very serious forms of misbehavior. In such cases, a longer term plan of action is necessary to prevent the student from making life miserable for the teacher, the rest of the class and the problem child him or herself. This is the third level of management -- handling severe behavior problems.

How does your mentor/cooperating teacher deal with such cases? You will need to rely primarily on discussion with the teacher to find out since you may not have observed any such cases and since much of the teacher's response may take place outside of the regular class time. Ask about one or more cases which the teacher has encountered and about her/his policies.

What are the district and/or building policy with regard to such matters as sending students to the office, involving parents/guardians or the principal in the process, and suspension from the classroom?

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Written Report On Field Assignments 1 and 2
Analysis of Mentor Teacher's Classroom Management

Format: Typewritten double spaced, 6-10 pages

Due: October 8

Suggested outline:

- I. Introduction
    - A. Brief description of the classroom context (Grade level, number and types of children, etc.
    - B. Purpose of the paper
- II. Level 1 - Organization and procedures
    - A. Overview - Description of the organization and structure of activity for a school day
    - B. Analysis of selected routines
        - 1. Identification of the selected routines and how they fit into the overall organization
        - 2. Analysis of selected routines (Your final version of your forms may be used here)
        - 3. Summarize your mentor teacher's approach to establishing classroom organization and procedures. Consider uses made of explaining, modeling, guided practice, giving feedback and guidance, use of consequences or other kinds of strategies.
- III. Level 2 Handling routine cooperation problems
    - A. Describe your mentor teacher's approach to handling such problems
        - 1. Hierarchy of responses
        - 2. Example cases (indicate whether you actually observed them)
    - B. Describe the over all tone of the classroom, the frequency of such problems, etc.
- IV. Level 3 Handling severe behavior problems
    - A. Describe the teacher's approach to such problems, illustrating with one or more examples (probably described to you by the teacher rather than having been observed)
    - B. Describe any building or district policies concerning teachers' handling of behavior problems
- V. Discussion
    - A. Discuss your mentor teacher's classroom management as it relates to the major themes in the assigned readings
    - B. Assess what you have gotten out of the observation and analysis, what questions or issues have been raised for you, and what further steps you (or others) might take to prepare you for managing a classroom.

TE306C Lesson 1-Integratir
Reading and Content
Learning

TE306C Elementary Interdisciplinary Curriculum

Field Assignment for Part 2
Intergating Reading and Content Learning

Rationale

The Academic Learning Program stresses the teaching and learning of subject matter. We examine the nature of the subject matter in the major curriculum areas and the processes by which learning of that subject matter takes place. Teaching methods and strategies are taught which are consistent with these understandings.

Much of the Program deals with the various curriculum areas as distinct entities since there are important differences among them and since each has to be understood if it is to be taught effectively. However, there are important ways in which the various areas interrelate. Real world problems often require knowledge from more that one area, and even the learning of one area often requires knowledge of another.

Recent developments in research on reading comprehension and learning in science and other "content" areas indicate that there are ways in which learning in one area is essential for meaningful learning in the other. Students are often unable to learning meaningfully from content textbooks, while development and use of content knowledge is an essential component of reading comprehension. These interrelationships point to the importance of integration or coordination across curricular areas.

The focus of the assignments for Part I of TE306C is the integration of reading and "content" area learning. In particular, they deal with the teaching and learning of strategies to help students monitor and improve their comprehension of what they read, and the use of these strategies in learning from content area text.

Overview of Assignments for Part 2

The major assignment for Part 2 involves planning and teaching a lesson(s) in which comprehension strategies are taught or used in the reading of expository text. The "reciprocal teaching" approach described by Palinscar and Brown will be a major resource for the planning and teaching assignment.

Selecting Topics and Scheduling

As indicated on the Field Assignment Timeline, the scheduled class will not meet on certain days in order to provide time and flexibility for students to carry out the field assignments. These indicate the preferred timing of the assignments, although they need not be done at these precise times if alternatives have advantages. Due dates for assignments can be modified for good reasons.

In consultation with the mentor teacher, identify the topic and text passage to be used in the lesson(s) to be taught on about October 27. There are several desirable features for selecting the topic and passage, not all of which will probably be feasible in a given situation. Expository text, ideally from the science or social studies curriculum, is preferable. You may use a passage from the text book itself or a relevant passage from some other sourdce. Planning and teaching more than one lesson would be very helpful, especially if it is coordinated with the mentor teacher's own planning and teaching. (No additional reports would be required.)

NOTE THAT THE TIMELINE MAKES IT NECESSARY TO SELECT THE PASSAGE FOR THE LESSON BY OCTOBER 15. Further information will be provided later.

Drafting a Plan

Using the "reciprocal teaching" approach as a resource, select the comprehension monitoring and fostering strategies to be introduced and/or practiced in the lesson, and the teaching strategies that you will use. Specify the content learning outcome(s) that the lesson should promote, given the text passage, information in the teacher's guide (if available), and any input you are able to get from the teacher. Draft a sequence of steps that indicates how you will use the time allocated for the lesson. Remember the teaching strategies of explaining, instructing, guided practice with feedback and praise.

You will able to revise all of these based on feedback from me and, hopefully, the mentor teacher. The important thing is to get started with some serious thinking about these aspects of the lesson.

If you are working in a kindergarten or first grade classroom, you will need to adapt the lesson to your reading the text aloud to the students. This has been done successfully in research studies, by previous 306C students and by many experienced teachers.

As you think about the comprehension monitoring and fostering strategies you will be teaching, try to anticipate what the students "naive" understanding and performance might be like. Try to specify the improvements you would like to help them make. For example, a common naive pattern in making summaries is for students to read or repeat a sentence verbatim. An improvement on this would be for students to learn to give summaries that paraphrase.

Revising Your Plan and Teaching a Lesson(s)

You will receive written feedback on your draft lesson plan from me. You should give a copy of your plan to your mentor teacher in time to get her or his feedback. This along with further guidance in class will be used in revising and elaborating your plan.

Plan to teach your lesson on October 27 (no class that day) or as soon as possible thereafter. The mentor teacher will be provided a form on which to give written feedback.

Observing and Discussing with the Mentor Teacher

Some of the mentor teachers have reported that they are using the reciprocal teaching approach, or aspects of it in their classrooms. If your teacher is doing so, you should make a point of coordinating your plan with what s/he is doing. It would be very beneficial if you could observe such a lesson. Try to have a follow up discussion as well.

In any case, it will be useful for you to discuss your ideas about the approach with your teacher. Remember , the focus is on helping the students learn strategies for fostering and monitoring their comprehension of expository text, and using them in reading "subject matter content" reading.

Lesson Report

You will prepare a written report that describes what happened during your lesson and your assessment of it. Further guidance for preparing the report will be provided in class. I will grade and provide written feedback on your report. You should share your report with your mentor teacher as well.

Suggestions for Lesson 1 Report

Attach your lesson plan or a copy of it to the report. It is not necessary to describe your plan in detail in the report. However, note any intended departures from the plan as you describe what actually took place.

Here is a suggested outline for the report:

I. Introduction - Identify the grade level, topic, source of the passage and its relation to the curriculum, and the comprehension strategies you addressed.

II. Description of the lesson - Describe in some detail what you did and how the children responded

III. Student learning
   A. Explain your assessment of the students learning (or degree of mastery) of the strategies you taught.
   B. Explain your assessment of the students' understanding of your intended content learning outcomes.

IV. Analysis of lesson
   A. What were the major strengths of the lesson?
   B. What were the major weaknesses of the lesson?
   C. What would you do differently next time or what will you do next time(if you plan to do another lesson)

V. Summary/conclusion
   A. What is your assessment of the value of this approach?
   B. What implications does this approach and your experience with it have for your future teaching?

Written feedback and your grades for the plan and report will be provided on the attached forms.

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Part 3
Student Writing and the Learning of Content

Rationale

The focus of Part 3 of TE306C is on student writing, the ways it can be used to help students learn subject matter content, and the ways that use of writing in subject areas other than language arts can help students learn to write.

Student writing can be a powerful tool in the educational process. Writing requires thinking. Careful selection of writing tasks is a way of influencing student thinking. As writing strategies come under the control of the learner, they become tools by which the learner can influence his or her own thinking.

The products of writing provide a basis for inferences about student thinking and learning. Unlike discussion, with writing tasks all students must actively think for themselves, and the evidence remains as a basis for later reflection by teacher and student.

From this perspective, learning to write goes beyond the province of language arts. In some respects, learning to write becomes learning to learn in other subject areas. The purpose of this part of the course is to help you get started in this important form of curriculum integration.

Overview of the Teaching Assignment

The major assignment is to plan and carry out with the children a lesson(s) in which student writing supports their learning of subject matter content (in addition to writing per se). As with the reciprocal teaching lesson, the lesson(s) should be designed to help improve their writing strategies as well as to help teach "content."

A variety of options are open, drawing on one of both of the two themes reflected in the Manual for Instruction (in the reading packet for Part 3). These themes are: (1) reading as a process including prewriting, drafting and revising, and (2) use of specific text structures such as compare and contrast or explanation.

At a minimum, you should plan one full lesson plus a follow up in which you provide feedback to the children. Use of more than one lesson is encouraged where feasible for both you and the mentor teacher. The lesson(s) should include some form of prewriting activity as well as composition of a draft. The prewriting may involve a form of brainstorming, use of a text structure analysis, or a combination. If appropriate and feasible, a final draft for an appropriate audiance (peers, parents, another class, etc.) could also be prepared.

A lesson report similar to that for the reciprocal teaching lesson will be required. Further information and assistance in planning your lesson will be provided in class and the readings (especially the Manual for Instruction). Class attendance and participation will be important in understanding the assignment and refining your plans.

Selecting a topic

You should have your topic and the nature of the writing task chosen by November 5.* Working with your mentor, find out what topics will be under study around November 17.* Can you find any aspects of these topics that would fit a specific text structure? (e.g., comparing two cultures, regions of the country, mathematical operations or kinds of animals; explaining a process or procedure; or analyzing a problem or a cause and effect relation). Find out if the teacher already has plans for any appropriate writing projects to which your assignment could relate. If use of a specific text structure does not seem to fit any of the topics, or if you prefer, select a topic and try to define a writing task that would push the children to think about and apply an important idea(s) for the topic.

Learning from your mentor teacher

For both its own sake and for the sake coordinating what you are doing with the teacher's plans, find out as much as you can about your mentor teacher's approach to and use of writing. Is there a writing curriculum? In what contexts is writing taught and used? What kinds of strategies, skills or concepts does your teacher conceive as involved in learning to write or write better?

Your mentor teacher should have revceived a copy of the Manual for Instruction last year. You should refer to that in communicating your ideas about your plans, etc. If s/he does not have a copy of the manual let me know so that one can be provided.

Arrange to have your mentor teacher review your lesson plan at least once before you arrive to teach it. Feedback from the mentor and myself can be used to produce your final plan. In addition to the written feedback your mentor teacher will be asked to provide, try to arrange for a time to talk about it as soon as possible after teaching. Be sensitive to the other demands on the teachers, but take advantage of any time they are able to give.

Readings

Readings for Part 3 are available from Kinko's. The packet runs about 113 pages. Quite a lot that is made up of resource materials in the Manual for Instruction. I believe that this resource is worth the investment and that you will find it useful as you go on to teach in your own classroom.

Writing to see and think. From Writing in the Arts and Sciences, (excerpt) pp.18-25.

Beyer, B.K. (November, 1982) Making the pen mightier. Phi Delta Kapan, pp. 193-196.

Raphael, T.E., Englert, C.S., and Kirschner, B.W. (1986) Text structure instruction within process-writing classrooms: A manual for instruction (Occasional Paper No. 104). East Lansing: Michigan State University, Institute for Research on Teaching.

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Part 4 - Unit Planning

Rationale

The last part of TE306C deals with unit or long range planning. This kind of planning is necessary for daily and weekly planning to have direction and systematically address the development of important student knowledge rather than being just the planning of things to do or mechanically following the book. Thus, unit or long range planning is something that will be a routine responsibility for your student teaching, not a special assignment added to it. The unit planning assignments in TE306C represent an opportunity for you to get started on this responsibility with some support and guidance and before the pressures of day to day teaching, planning, grading of student work, and so on become great.

Overview of the Assignments

The first step will be to prepare, in cooperation with your mentor teacher, a curriculum chart which identifies the areas of the curriculum for your class for the period of January through March and, in broad terms, the scope and sequence for each. This chart will be useful in further preparing for student teaching and planning with your mentor teacher for your assuming of responsibilities as well as for selecting the units that you will work on right away for TE306C.

Next, select in cooperation with your mentor teacher two units on which you will work for your TE306C assignments. Then, using your mentor teacher, teacher's guides, and other sources as resources, you will prepare unit plans for each of the two units. The specific requirements and suggestions for these plans are presented in a separate section.

Why Written Unit Plans

Student teachers often note that experienced teachers do not seem to have very extensive written plans and question the value of their having to write out their plans. Experienced teachers typically have quite extensive plans-in-memory for much of their curriculum. Furthermore, experienced teachers often have teacher's guides and other resources that they have adapted for their use that provide external memory support. As newcomers to these units, written plans are essential to help you monitor and push your own thinking and remember what you have come up with as well to communicate your intentions to your mentor teacher and university faculty. In preparing the requirements and suggestions for the written unit plans, I have tried to identify those things that will be most helpful to write while keeping the volume of writing to a manageable level. These categories should serve as a model for what you routinely think through for all the units you teach.

Role of the Mentor Teachers

Unit planning is sometimes viewed as a test of originality or creativity. While the abilty to make improvements in curriculum and teaching is at the core of being professional, being creative or original for its own sake is not. The important issue about a unit plan is its quality. It is much more important that you have a sound plan that will enable you to teach effectively than for you to have created it entirely from scratch. In fact, it is unrealistic to expect yourself to create "original" units for very many of the areas that you will teach in your student teaching or your first year in as teacher. Furthermore, at the outset you are still learning what it means to plan and be ready to teach a given topic. Even in the long run, you will continue to find resources that improve on some of your own original ideas. The source of your professional pride should be in the quality of the experience and learning you provide, not in whose ideas you use.

Therefore, your mentor teacher and the resources that s/he uses are very important in preparation of your initial units. Your mentor teacher will serve as model and coach. I will also be coaching, emphasizing implementation of themes and approaches central in the Academic Learning Program. As you proceed, try to identify the resources your mentor teacher has drawn on and learn to use them yourself. Finally, try to find new resources that will support your continuing efforts to improve your plans. Sharing of ideas with other teachers and resource people will be a major source of such resources. Share routinely with other Academic Learning students and faculty as well other teachers whenever you have the chance.

Suggested Procedures and Requirements for Unit Planning Assignment

Prepare a Curriculum Chart

Work with your mentor teacher to prepare a curriculum chart showing the general scope and sequence for all the areas of the curriculum for the period of January through March. Much of this is probably already determined by your mentor teacher, although there may be places where some negotiation of sequence or even selection may be approriate. This chart will help you develop your long term planning agenda. You will need to discuss a tentative plan for your assuming responsibility for planning and teaching. Your earliest responsibilities will include understanding and implementing your teacher's plans. (You should already be doing some of this.) Cooperative planning and planning with a lot of coaching should come next, with the degree of coaching gradually fading (but probably never to zero).

The cells of the chart should represent weeks for each curriculum area with the rows representing the various areas. The inital specifications may be somewhat superficial but can be elaborated as you proceed. The preparation of the chart is a joint effort with your mentor teacher.

Get Organized

I suggest that you get organized right from the start by setting up a notebook with sections for each curriculum area, or even a notebook for each area. Keep your notes, brainstorming, private problem solving and drafts of parts of your unit plans, etc. in the notebook.

Selecting Units to work on for your TE306C Assignment

In cooperation with your mentor teacher select two units on which to focus for the TE306C assignment. Since part of the rationale for this part of the course is to help you get as much long range planning done as posssible before you start student teaching, select new topics rather than ones that you are preparing or have prepared for other courses. You are encouraged to work closely with your mentor teacher in your unit planning, so try to arrange to take best advantage of his or her particular strengths and availability.

Developing Background

Part of this process involves finding out as much as you can about what the mentor teacher's unit would be if s/he were teaching it. Find out the resources and materials that your mentor teacher uses when s/he teaches the unit. Review these and discuss them with your mentor teacher. How does your mentor teacher think about what the students are to learn? What use does (and did) s/he make of the materials in planning and in teaching? What kinds of activities and teaching strategies does s/he usually use? What instructional routines? What additional resources can you find (include other teachers and university instructors as well as printed materials, equipment,etc.)? All this is not to say that your unit should be just the same as the mentor teacher's. However, that may be a good place to start. Remember, the goal is a quality plan, not an entirely original one.

Documenting Your Unit Plan

The following elements should be included in your unit plan. You may include additional elements as well.

I. What is to be learned?

Central question, problem or task. To provide a focus for the unit for both you and the students. Try to formulate this in a way that will be meaningful to the students as they begin the unit. A unit on division might pose the question, How can we figure out how many teams of six we could form from all the children in our school? A unit on cells might pose the question, What are living things made of?

List of concepts. The key terms that will be used in the unit. This is a quick way to define the scope of the unit.

Concept Map. To represent the relationships among the concepts. You may prefer an alternative way of doing this for some kinds of units. A flow chart might be preferable for representing a procedure for example.

Anticipated prior knowledge. What prerequisite knowledge do you expect the students to have? What naive conceptions or strategies might you expect?

Objectives. These should clearly identify the main learning outcomes of the unit. They should be defined in terms of some combination of the following:

Tasks that the students should be able to perform
Principles or main ideas they should understand and apply
Strategies or processes the students should be able to use
Skills the students are to develop

II. How will you monitor and assess student understanding?

Assessment ideas. Examples of ways you could assess student learning on a daily basis and for the unit.

III. What teaching strategies will you use to achieve the objectives?

Activity ideas. Brief descriptions of activities you could use. This could be done by reviewing curriculm materials and indicating the ones you think are most appropriate, etc. You needn't copy or rewrite a lot of material in carrying out your planning. Indicate which activities address which objectives. You might find it useful to make a chart to show this.

Plans for first 2-3 lessons. Detailed lesson plans for the first few days. More than this is probably not worthwhile since you will probably have to make adjustments after beginning the unit.

Timeline for major activities. (optional) This is an efficient way of doing some planning of activities for the entire unit.

Instructional routines. (optional) Plans for how you will organize the class for various kinds of activities that will be carried out on a regular basis as part of the unit. Small group work, science activities, individual student written work, etc.

TE470C Student Teaching
Planning Requirements

ACADEMIC LEARNING PLANNING REQUIREMENTS
Winter Term, 1988

I. Unit Planning Requirements for each unit (or chapter) in math, science, and social studies

A. Before starting to teach the unit (reviewed by mentor teacher and/or 470C instructor; limited to approximately the front and back of one page)

What is important for students to learn?

1. Central question, problem, or task
2. List of concepts, terms (not too long)
3. Concept map, chart, unit outline, or unit overview

How will I know if students are understanding?

4. Objectives - stated in terms of what students will be able to do with the knowledge/skills learned
5. Sample assessment questions, activities

How do students think about this content/skill?

6. Anticipated student prior knowledge, misconceptions; potential student difficulties

B. During the unit

What activities/experiences will help students learn?

1. Daily lesson plans (specify unit objectives being addressed)

How will I know if students are understanding?

2. Unit test, quiz, writing activity or other strategy used to assess student understanding (in addition to daily monitoring of student learning)

II. Long-range planning in the Language Arts areas

A. Format negotiated with student teaching instructor and mentor teacher

B. Identify one piece of Language Arts curriculum or an interdisciplinary unit that will be approached using the unit planning format (in I above)

III. Daily Planning Guide

A. Daily written plans for each lesson taught

1. Format negotiated with mentor teacher and 470C instructor
2. A guide to daily teaching - should be more than a box in a teacher planning book but do not need to be lengthy
3. Each lesson plan must indicate which objective(s) in unit plan is/are being addressed

B. Plans must be reviewed and approved by mentor teacher in advance of the day the lesson is being taught

C. Daily (and unit) plans must be available in the classroom for your

470C instructor to look at before, during or after observations. This will help the 470C instructor put the lesson being observed into context.

III. **Reflective Pieces for Two Units** (2-5 page handwritten or typed essays; one due at midterm, one due at end of term)

A. Analysis of student learning

B. Reflections on your teaching and what you have learned

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Academic Learning Program
STUDENT TEACHING PLANNING EXPECTATIONS
Winter, 1988

Long-term Unit Planning

Long-term planning is a critical part of becoming a successful conceptual change teacher. Such planning requires you to think carefully about student learning goals and how to achieve them. From past experience with student teachers, we have found that it is easy for student teachers to fall into a pattern of day-to-day planning and teaching that is more procedural (What are we going to do tomorrow? How can I fill up that hour?) than substantive (What do I want the kids to understand about this? Why is it important to learn? What difficulties are students having understanding it?). An important goal of the Academic Learning Program is to help you become a teacher who is thoughtful (before, during, and after instruction) about:

a) what is important for students to learn and understand in a given subject matter area,
b) students' ways of thinking and learning those concepts,
c) how to help students develop such understandings, and
d) keeping track of students' thinking, analyzing their conceptual development and/or conceptual change.

The long-term planning requirements for student teaching are designed to help you develop patterns of planning in which you seriously and consistently consider these issues. Questions about these issues frame the Academic Learning unit planning format: What is important for students to learn? How do students think about this content? What activities/experiences will help students learn? How will I know if students are really understanding?

For long-term planning in math, social studies, and science you will develop written overall unit plans for each chapter or unit, following the Academic Learning unit planning format. In the Language Arts areas, a different approach to long term planning may be more appropriate for your mentor teacher's curriculum. Therefore, long term planning in these areas (reading, writing, literature, penmanship, language skills, spelling, etc.) will be negotiated with your mentor and your 470C instructor. However, you will be expected to identify (in consultation with your 470C instructor and your mentor) at least one piece of the Language Arts curriculum or an interdisciplinary unit that will be planned using the Academic Learning unit plan format. This unit could be drawn from traditional basal readers, grammar texts, spelling programs, etc. and/or from outside resources. For example, you might develop a unit focused on poetry or on a particular piece of literature. Alternatively, the unit could involve report writing or reciprocal teaching strategies in social studies or science.

Daily Planning

Daily written plans are required for each subject you are teaching. These are the plans that you will use as you teach to help you keep the lesson focused and to help you keep organized for the lesson. They do not need to be lengthy or typed. They should be plans you can follow as you teach. The amount of detail that is written down will vary depending on how familiar you are with the content, how familiar you are with the management routines, etc. However, filling in boxes in a teacher planning book is NOT adequate daily planning for a beginner. Teacher plan books should be used for planning an overview and schedule of the day and the week.

Daily plans should clearly link to your long-term goals. Indicate in some way how your daily plans link to your unit objectives.

Your format for daily planning will be negotiated with your mentor teacher and your 470C instructor. The format you develop may vary from subject area to subject area. Plans would typically include a list of activities, key questions you will ask, reminders to yourself about key directions or explanations you will give, notes about management routines and materials needed.

Organizing Your Plans

You will need to develop some system for keeping your plans organized. Many students find looseleaf notebooks very helpful. You can use one large notebook with dividers for different subject areas or use one notebook for each subject area. A system of folders for different subject areas is also acceptable. Include in these notebooks or folders:

--long-term plans (central question, concept map, objectives, etc.)
--daily plans
--one copy of any handouts, worksheets, tests you use
--(optional)sample student work
--(optional) written feedback on observations from mentor teacher and 470C instructor

Development, Approval and Revision of Your Plans

You should seek your mentor's and your 470C instructor's advice and help in developing both daily and unit plans. For example, your mentor can give you advice about how to structure activities without chaos erupting. Your 470C instructor can help you figure out an appropriate central question. There are many ways these people can be helpful to you in finding resources and making decisions about what and how to teach. Your plans will be improved by seeking their help from the beginning. Your primary goal (especially at the beginning) should be the development of high quality plans rather than on the creation of something original.

Required Written Reflections for Two Units

For two units you teach during student teaching, you will write a reflective essay, analyzing student learning and describing your strengths and weaknesses in actually teaching the unit. You might also want to keep an ongoing daily or weekly journal. These journal entries could be included with your reflective essay.

Due Dates for Reflective Pieces. The first reflective piece will be due at the midterm conference you have with your mentor teacher and your 470C instructor. The second piece will be due at the final evaluation conference at the end of the term. You will need to make two copies of each piece - one for your mentor and one for your 470C instructor. These papers do not need to be typed. The essay should be approximately 2-5 pages long (handwritten or typed).

Things to Think About in Constructing the Reflective Pieces:

Analysis of Student Learning. In evaluating student learning, think back to the beginning of the unit. Where did the students start? What progress was made? What ideas still seem difficult for students? Describe changes in your students' thinking and understanding rather than just saying "They knew this, but they didn't know that."

Analyze student papers and tests. Discuss how you used evidence from these and from discussions in class to decide what your students understood and what was still difficult for them. Did the questions you asked help you assess student learning? Do you wish you had asked different questions?

Contrast your "intended" curriculum with what students actually learned. Were you surprised by any of the results? Were there any unintended learnings (about the subject matter, about how to learn, about the discipline being studied, about themselves as learners)? Does your analysis of student learning give you insights into how you would teach the unit another time?

Reflections on Your Teaching and What You Have Learned. Select from the following list or generate your own categories to describe your unit teaching and what you have learned from it:

- Changes you made as you taught and why
- Strong and weak points of your planning and teaching
- suggestions for improvement in the content and conceptual development of the unit
- managment lessons learned or questions raised
- places where you see links between what you've learned in Academic Learning courses and this unit teaching experience
- the role(s) played by your mentor teacher or 470C instructor in helping you learn from this unit (or roles they could play)
- ideas about ways to help students develop better understandings
- ideas about how to link this unit to other units (even in different subject areas)

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Very early in January, you will meet with your mentor teacher and your 470C instructor together. During this meeting you will negotiate how your plans will be reviewed. Typically, your 470C instructor will be more involved with your long-term unit planning, and your mentor teacher will be more involved with the daily planning. Make sure you are clear about the procedures that the three of you develop.

You should expect to be asked to make revisions in plans - both in the unit plans and the daily plans. Therefore, daily plans need to be ready at least a day ahead of time (or more as negotiated with your mentor). Unit plans will need to be available well ahead of the dates they will be taught.

Reflections as Part of the Planning Process

Reflecting on your teaching after lessons and units will help you learn the most from your teaching experience. Such reflection can guide future planning. There are many different kinds of things to think about after teaching - management concerns, student motivation and interest, discipline problems, etc. These are all important areas of reflection, but we would like you to pay special attention to reflection on student learning. Think about your intended curriculum and what sense students actually made of it. What difficulties did they have? What seemed too easy for them? What intended and unintended things did they learn about the content? about how to learn? about themselves as learners? about the discipline being studied?

There are two ways the student teaching experience is structured to encourage you to develop this habit of reflection and learning from your own teaching experience: 1-post-observation discussions with your student teaching instructor and mentor teacher, and 2- written reflections on two units you teach during student teaching.